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JOURNAL.

of the

Straits Branch

of the

Royal Asiatic Society

For the Year

1917.

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Part 76. Journal pp. 55—168, published August 30th, 1917.

Part 77. Journal pp. 169—276 with title page, published December 29th, 1917.

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PRINTED AT THE METHODIST PUBLISHING HOUSE
1917.

ERRATA.

p. iii. transpose the words *Librarian* and *Treasurer.*

p. 153, under the two illustrations for *Abdul Rawi* read *Abdul Rani,* and under the right hand figure for *898* read *878.*

SMITHSONIAN
LIBRARY

506.595

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1917.

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STRAITS BRANCH
ROYAL ASIATIC SOCIETY.

[No. 75]

JOURNAL

April, 1917

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[No. 75]

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National Museum

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1917

THE

STRAITS BRANCH

OF THE

ROYAL ASIATIC SOCIETY

Council for 1917.

Hon. C. J. Saunders	*President.*
W. Makepeace, Esq.	*Vice-President for Singapore.*
Lieut.-Col. the Hon. A. R. Adams	*Vice-President for Penang.*
Hon. A. H. Lemon	*Vice-President for F. M. S.*
I. H. Burkill, Esq.	*Hon. Secretary.*
Dr. R. Hanitsch	*Hon. Librarian.*
C. Bazell, Esq.	*Hon. Treasurer.*
Professor J. Argyll Campbell	*Councillors.*
Hon. H. Marriott	
Capt. J. C. Moulton	
H. Robinson, Esq.	

PROCEEDINGS

of the

Annual General Meeting.

Minutes of the Annual General Meeting of the Straits Branch of the Royal Asiatic Society, held at the Society's rooms in the Raffles Museum, at 5 p.m. on Tuesday, February 27th, 1917.

PRESENT:—Hon. C. J. Saunders, President, in the Chair, Rev. A. J. Amery, Messrs. C. Bazell and A. W. Bean, Professor J. Argyll Campbell, Captain A. R. Chancellor, Drs. J. A. R. Glennie, J. M. Handy and R. Hanitsch, Mr. W. Makepeace, Hon. H. Marriott, Rev. W. Murray, Messrs. Ong Boon Tat, H. Robinson, See Tiong Wah and S. G. Williams, Dr. R. van Beuningen van Helsdingen, Messrs. H. N. Ridley, and I. H. Burkill (Hon. Secretary): also several visitors.

The minutes of the meeting of February 10th, 1916, were read and confirmed.

The Annual Report and Statement of Accounts which had been circulated in print were accepted on the motion of Mr. H. Robinson, seconded by Dr. J. A. R. Glennie.

The Hon. C. J. Saunders moved, and the Hon. H. Marriott seconded that, as recommended by the retiring Council, Dr. D. J. Galloway, a past-president, be elected an Honorary Member on account of his notable service to the Society. Dr. Galloway was elected an Honorary Member upon a show of hands.

The Hon. Treasurer explained that the Council had determined to place two thousand two hundred dollars ($2,200) from the Society's reserve funds into the Colonial War Loan and to earmark the interest therefrom for use in connection with the Library.

The following were elected consecutively office-bearers for 1917:—

Hon. C. J. Saunders	..	President.
Mr. W. Makepeace	..	Vice-President for Singapore.
Hon. A. R. Adams	..	Vice-President for Penang.
Hon. A. H. Lemon	..	Vice-President for the F. M. S.
Mr. I. H. Burkill	..	Hon. Secretary.
Dr. R. Hanitsch	..	Hon. Treasurer.
Mr. C. Bazell	..	Hon. Librarian.

A ballot was next taken for the election of four Councillors.

On the motion of Dr. J. A. R. Glennie, seconded by Captain A. R. Chancellor the meeting returned a vote of thanks to the retiring Council.

The President asked Mr. H. N. Ridley to give an address on the subject of the Scientific Exploration of the Malay Peninsula, while the result of the ballot for councillors was being ascertained. Mr. Ridley spoke as recorded in the Society's Proceedings:* and a discussion followed upon the means by which further work might be encouraged.

The President proposed a vote of thanks to Mr. Ridley for his address, which was accorded: and he announced that as the result of the ballot the Hon. H. Marriott, Captain J. C. Moulton and Mr. H. Robinson had been elected Councillors, that Dr. W. G. Shellabear and Professor Argyll Campbell had received an equal number of votes for the fourth place and that five other members had received votes. He suggested that as Dr. Shellabear had not returned to the Colony and as the date of his return appears uncertain, Professor Argyll Campbell should be asked to serve. On a show of hands this proposal was adopted.

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* pp. vii—xi.

The Scientific Exploration of the Peninsula.

An address at the General Meeting of February 27th, 1917.

By H. N. Ridley, F.R.S., C.M.G.

The Object of the Scientific exploration of a country is to get a clear systematized knowledge of the *Fauna, Flora, Ethnology, Authropology* and *Geology* of the country,—in fact of the whole of the Natural History of the area,—and to publish it in such form that it may be accessible to everyone.

To get a clear idea of the whole of Nature, its origin and development, it is not sufficient to study one group alone: for all the various sections of Natural Science have a more or less close relationship with each other; and before we can come to any satisfactory deductions from the facts in one part of the subject, we must know or be easily able to find out the stories of the other parts.

In the early days of the development of a Colony, such as ours, the study of Natural History is usually commenced by a few Amateur Naturalists, who collect specimens and observations on all branches of the subject. Later we get a few to take up special groups or subjects, individually; for it is nor possible for any one man in a lifetime to study every group in detail in so rich an area as a tropical region.

Later still a Museum or Museums are formed, with scientific men attached who, assisted at least by the Government, are able to devote their time to collecting and preserving specimens, as well as recording observations and data, and storing the specimens in the Museums for reference, and publishing the information obtained in reports or publications. And here comes in the great value to the world of such societies as ours which record facts of Natural history, the geography of the country, and all that belongs to a complete knowledge of the country we live in.

Now in the beginning of these researches we find that certain groups of animals are more popular than others, such as birds and butterflies, and we therefore find a larger number of collectors of these animals, and consequently we get sooner a good knowledge of these groups than we do of say beetles or molluscs; and we require a number of collectors and students of these more difficult groups to collect. In many of the country Natural History Societies at home the members contrive to get one or other of their numbers to take up a single group and devote himself to collecting that group, assisted of course by others who send him any specimens they chance upon. I do not know how far some such system could be adopted here, but there are many of our members living in distant parts of the country who could materially help by catching and sending insects or other such easily collected animals to the various naturalists who in this country are studying them.

When I first arrived in this country in 1889, large areas of forest and mountain, now easily reached by train and motor car, were only accessible by long and difficult marches, and the few naturalists in the country found it impossible to get to these remote spots in the time and with the funds at their disposal. But the rapid development of agriculture of late years has resulted in the increased accessibility and in the settling of Europeans in parts of the Peninsula at that time out of reach. Many of these Europeans would assist in collecting if shown the way, I am sure, and indeed I have great cause to be grateful to very many who in the course of my wanderings into their districts have given me the greatest assistance in collecting plants.

But the wide developments of agriculture of late years has not been, alas, all to the advantage of the Naturalist, for the felling and burning of the forest has caused the disappearance of many plants and probably many insects and other animals; and as this work is still continuing, it becomes of more and more importance to save specimens (which is all we can do) of the vanishing flora and fauna, ere they become as extinct as Dodos.

I would now like to run over the various branches of Natural Science and see how far we have progressed towards a systematic investigation and record of the separate groups as far as regards this country.

In Zoology we have already published the account of the *Reptiles* and *Batrachia* by Boulenger, and I understand the works on the Mammals and Birds are nearly complete. These have been done by the zoologists of the Federated Malay States Museum.

In fishes we have an account of those of fresh-water by Dunck, a Naturalist who was here some years ago. In Marine fish we have no separate work; but those of our seas have been mentioned in works by Bleeker and Weber, dealing with the fishes generally of the Indian and Malayan Seas.

A complete separate account of those occurring in our own waters is required.

On Molluscs papers have been written by De Morgan.

Of Insects *Butterflies* have been well done many years ago by Distant in the well known book *Rhopalocera Malayana* but of course there have been since then many additions and corrections made.

The *Cockroaches* have been well described and figured by Dr. Hanitsch in our journal lately and I believe the *Mosquitos* are pretty well known.

But of the rest of the insect fauna we have only scattered papers and descriptions in journals and other works which are often inaccessible to the local student and in any case entail a lot of work in searching among descriptions of species from all manner of countries to find the ones recorded from the Malay Peninsula.

The same state of affairs rules also in nearly all the other groups of invertebrates from centipedes, and spiders to Corals and Marine organisms generally. It would be highly desirable to collect all the notes and descriptions of the various groups applying to the Malay Peninsula, and put them together and publish them in an accessible form so that we might have an idea of what amount of knowledge on these animals had been obtained already and form a base for further work.

In *Botany,* at least that of flowering plants and ferns, progress is being made as fast as possible. Before my arrival in the East in 1889, it was proposed by the F. M. S. Government to publish a flora based on the plants collected by Kunstler, Scortechini and Wray in Perak, Sir Cecil Clementi-Smith very wisely urged that the flora should not be confined to these collections, which were practically limited to the Perak mountains; but that a flora of the whole of the Malay Peninsula should be taken in hand.

The work was to be done by Dr. King and Sir Joseph Hooker: the number of plants known or collected in the Peninsula at that date was small; and King arranged to publish a preliminary series of papers known as the Materials for a Flora of the Malay Peninsula in the *Journal of the Asiatic Society of Bengal.* This took many years; and in fact 2 orders *Euphorbiaceae* and *Urticaceae* are not yet published. In the meantime extensive collections were made all over the Peninsula and the work got fuller and fuller as it went on. Sir George King died some years ago and Mr. Gamble, and Major Gage of the Calcutta Gardens continued the Materials, while I did the Monocotyledons and some other orders. I am now engaged in re-writing the whole flora, to be published as soon as may be in book form, condensed and largely revised and added to, so that the public may in a few years, I hope, possess a work in a few volumes so written and illustrated that they will have no difficulty in identifying any plants that they may meet with. The work will take some time as there are known between 8,000 and 9,000 species; and all that have been already described will have to be checked over and carefully re-examined. However the greater part of the *Polypetalae* and *Monocotyledons* are already finished, and I hope in a few years to complete the work.

The Cellular plants,—Mosses, Lichens, Fungi and Algae, have not been entirely neglected; but such as have been described have been published in scattered papers in various journals; and there is a large field for work both in collecting and investigating in these groups.

Considering the importance of tin and other minerals to the Peninsula, it seems remarkable that so long a period elapsed before any attempt was made to study the *Geology* of the country. Practically nothing of importance was published till the arrival of Mr. Scrivenor. Logan in Logan's journal published indeed some papers on the rocks of Singapore, but he was no geologist and the work was extraordinarily erroneous.

We have now at least several extremely valuable papers by Mr. Scrivenor; and we shall hope for many more such researches as he has made.

Ethnology and *Anthropology* we are well advanced in, thanks to the works of Skeat, Wilkinson, Robinson and many others.

But there is one branch of Natural Science which has been curiously neglected, that of *Meteorology*. It is true that rainfall readings have been taken and published for many years in some parts of the Peninsula; but the returns are in many cases I fear dubious; and in the earlier days of Singapore when the returns would have been exceptionally valuable, as showing us if there had been any change in the climate at all, there are so far as I know no records. The late Mr. Knight was the only person I know of, who took an interest in the subject at all. Unfortunately he published little; but he may have left notes behind him which would be worth preserving, if they could be obtained by the Society. It would be very desirable if some member of the society would take up the subject of the meteorology of the Malay Peninsula collecting and utilizing such returns and reports published during the last 50 years. The subject is one of much interest and importance.

When I arrived in Singapore in 1889, the greater part of the Peninsula was still a blank as regards Natural History research, the few Naturalists we had then, had only been able to collect in a few of the accessible parts such as Singapore, Malacca, Penang and parts of Perak. Even the geography of the Peninsula was very far from complete as may be seen by referring to our first editions of the Map, and even now large areas of the centre and East coast have not yet been visited by any Naturalists. When this is done without doubt very many more new species will be collected in almost every group.

Taking Botany again as a sample of how far we have collected specimens of all our flowering plants, I may say that by far the largest number of the plants of the low country are now well known, and it is not easy to get big additions of novelties in the low lands of etiher coast, and that thanks very largely to Messrs. Robinson and Kloss who have greatly added to our knowledge of the botany of the highest accessible mountains we have obtained the greater part of the flora of above 4,000 feet elevation. This does not mean that we know all the plants in our forests. It is a poor collecting trip still which does not yield some novelties even in the low country. But we have in our 9,000 known species a very large proportion of the flora, and enough to base at least some deductions as to the origin and history of the flora of the Peninsula.

We have practically a sample collection, not a complete one.

The same thing applies, I take it, to most of the zoological groups; but I believe that I shall not be wrong in stating that in Mammals. birds, reptiles and batrachians and butterflies we have now an almost absolutely complete knowledge of the species. The number of novelties to be added is probably small. Further explorations in out of the way localities will probably yield important results in most groups. We have not enough naturalists to get over the whole ground in a short time so that the residents in these distant parts may often be able to assist in sending specimens to our museums of insects or plants or other such things that they may accidentally come across. As an example I may mention that of two new kinds of bats which some years ago I accidentally obtained I believe that neither have ever been caught again.

I have now I think given some idea of the progress in Natural History that we have made here in the past quarter of a century. It is very considerable; but a great deal remains to be done. The Society by its Journal and by indirectly and directly interesting residents in the knowledge of the Natural History of the Peninsula has played an important part in this work, and I trust that it may continue to do the same for very many years to come.

ANNUAL REPORT

of the

Straits Branch, Royal Asiatic Society

for 1916.

On November the 4th the Society entered upon its fortieth year, having the name of one founder and of two who joined in the first year, still on the Member list,—the Right Rev. Bishop Hose, the Hon. Datoh Mahomed bin Mahbob of Johore, and the Ven. Archdeacon J. Perham of Chard, Somerset. The rules under which the Society works have been little altered since they were passed at the general meeting of January 21st, 1878. On July 15th of the same year, the Society having 142 members, issued its first Journal and in December a second, making the year's output 166 pages. The Society stands, this day, with 297 names on the member list.

The number of pages in the Journal of the year under review was 358. The average for the thirty-nine completed years of publishing has been 305.

The Society in the first year of its existence met frequently for the reading of papers: but it was found impossible to maintain these meetings: and when the practice fell into disuse, it became necessary to vest in the Council powers which councils of Societies rarely possess, asking the members to meet but once a year to regulate their affairs, by the election of a new council and by the ratifying of the proceedings of the retiring body. The arrangement tends to create an aloofness on the part of the members which the Council has been most anxious to dispel: and with that intention in 1915 two steps were taken: in the first place an offer was gratefully accepted from a member, Mrs. Legrew Watkins, that at the annual meeting she would exhibit her collection of objects used by the Ainus of Japan; and in the second place it was arranged that the Journal should appear oftener, if possible, than twice a year. The attendance at the last annual meeting was gratifying and Mrs. Legrew Watkins' exhibit most interesting. The Journal, which had appeared thrice in 1915, has appeared again thrice in 1916.

The Journal is now paged into an annual volume, and has been issued complete for 1916, with title page and index. It contained xxx + 328 pages, with six plates and two line blocks in the text. Its cost to the Society was $1,217.66 or 58% of the Society's income.

Of the income a further 22% was absorbed by salaries, stationery, postages, and other small charges essential to the running of the Society's office, leaving only 20% for the purchase of books, furniture, and for unusual causes of expense. A larger member-list, meaning a larger income, is desirable.

Also a larger inflow from members of short papers for publication is desirable.

The Hon. Treasurer's balance sheets for the last and the preceeding four years show the following figures:—

	1912	1913	1914	1915	1916
By member's subscriptions including life-members	1,356.08	1,195.00	1,293.68	1,329.68	1,110.00
By sales of Journals	503.13	542.41	425.96	175.98	478.26
By sales of Maps	3,274.80	565.20	513.60	292.00	446.15
By investments	189.92	125.49	86.48	385.75	250.40

Nearly half of the receipts in 1916 by sales of parts of the Journal came from the Hikayat Sri Rama, of which 51 copies were taken.

The Society's invested funds are less than a year ago by $1,500, in consequence of withdrawals from fixed deposit to meet the cost of printing the Hikayat.

The price of printing has unfortunately been raised against the Society: but this, it is trusted, will be but temporarily.

The Council has no new undertakings to record. The rule which lays it down that the object of the Society is to increase and to diffuse knowledge concerning British Malaya and the neighbouring countries has been strictly observed. One of the papers in the Journal treats of the Malay language, five of the History of the Peninsula, one of Malay customs, two of Malay plants, one of the action of a Malay poison, and two of Malay zoology. It may be recalled that the inception of the Society occurred just when the interior of the Peninsula was opened to exploration and many accounts of Journeys reached it; but such papers are rarer now. There were none in the Journal for 1916.

It has been stated above that the member list carries 297 names: that is the same as the last published list carried. By death the Society has lost two Honorary members, Sir Cecil Clementi Smith and Mr. A. Knight: and two, who were members, have lost their lives at the front in France—Messrs. H. E. Pennington, and P. Gold.

The Council elected during the year the following as members:

Mr. H. W. Ford,
Prof. J. Argyll Campbell,
Mr. J. G. Watson,
Mr. Shiva Prasad Gupta,
Mr. J. W. Cundell Ellis,
Mr. A. Rogers,
Mr. G. B. Kellagher,
Mr. Ong Boon Tat.

Mr. L. Rayman.
Mrs. Legrew Watkins.
Mr. Frank H. Myers.
Mr. W. E. Mann.
Mr. E. Stuart Young.
Mr. Arthur Mitchell Goodman.
Mr. G. F. C. Woollett.
Mr. H. C. Abraham.
Mr. H. H. Banks.
Mr. W. G. Stirling.
Rev. William Cross.
Mr. R. Balfour Blair.

His Highness, the Raja Muda, of Sarawak, was elected an Honorary member at the last Annual meeting.

Council. During the year Dr. R. D. Keith resigned from the Council, and in his place Captain J. C. Moulton was co-opted. The office of Vice-President, Singapore, fell vacant by the departure of the Hon. W. G. Maxwell from the Colony, but was not filled.

Library. The following books have been added to the library in addition to the serials received as exchanges:—

Brandstetter, R., An introduction to Indonesian languages, translated by C. O. Blagden .. ..
Hale, A., The adventures of John Smith in Malaya, 1600-1605 .. ..
Shellabear, W. G., An English-Malay dictionary .. ..
Skeat, W. W., Malay Magic .. ..
Posewitz, Theodor, Borneo, its Geology and Mineral Resources .. ..
Furness, W. H., Folklore in Borneo .. ..
Swettenham, Sir F., British Malaya (presented by H. Robinson Esq.) .. ..
A Set of "Papers on Malay Subjects" published by the F. M. S. Govt. (presented by Hon. C. J. Saunders)
Wilkinson, R. J., Malay Beliefs .. ..
Winstedt, R., An English-Malay Dictionary .. ..
The Ramayana, translated by Manmatha Nath Dutt ..

Kitab Gemala Hikmat	Malay texts
Pelayaran Abdullah	
Hikayat Hang Tuah	
Hikayat Abdullah	
Hikayat Awang Sulong Merah Muda	
Cherita Jenaka	
Hikayat Malim Dewa	
Hikayat Malim Deman	
Sejarah Melayu	
Hikayat Raja Muda	
Hikayat Anggun Che' Tunggal	
Pantun Melayu	
Hikayat Pelandok	

Skeat, W. W., and Blagden, C. O., Pagan Races of the Malay Peninsula (presented by the Hon. H. Marriott) ..

McNair, J. F. A., Prisoners their own warders ..
Baring Gould, S., History of Sarawak .. ..
St. John, S., Earlier adventures of a Naval Officer ..
Hubback, T. R., Elephant and Sladang in Malaya ..
Cowie, A., English, Sulu, and Malay vocabulary ..
Keppel, H., A visit to the Indian Archipelago ..
Davies, R. D., Siam in the Malay Peninsula ..
Ross, J. D., The Capital of a little empire ..
Read, T. H., Across the Equator .. .. ..
Batten, G. G., Glimpses of the Eastern Archipelago
Maryatt, F., Borneo and the Indian Archipelago ..
Hudson, H. H., Malay Orthography .. .. ..
Boys, H. S., Some notes on Java .. .. ..
Fokker, A. A., Tidong dialects of Borneo .. ..
Van Daventer, M. L., Daendels-Raffles .. ..

Presented by the Singapore Free Press.

It has been decided not to print the index to Malay Pantuns which Mr. H. Overbeck prepared and made over to the Society: and as it was considered inadequate by itself the Hon. H. Marriott has prepared another which he has presented to the Society, so that both may be preserved in the library together. Mr. Overbeck's index is by the third line, but Mr. Marriott's by the leading words. The Council's intention in preserving these is that members who interest themselves in the collection of Pantuns may easily ascertain whether such as they meet with are published or unpublished; and they consider that unpublished pantuns might well find a place in the Society's Journal.

I. Henry Burkill,
Hon. Secretary.

STRAITS BRANCH ROYAL ASIATIC SOCIETY.

Receipts and Payments Account for the year ended 31st December, 1916.

Receipts.	$	c.	$	c.	*Payments.*	$	c.	$	c
To Balance Brought Forward from									
last Account:					By Printing Journal No. 69 & 71 ...	1,993	28		
On Fixed Deposit: Mercantile Bank ...	4,700				,, do. do. No. 72 ...	376	64		
do. Chartered ,, ...	1,560				,, do. do. No. 73 including				
Current Account Mercantile ,, ...	633	17			annual Report	458	75		
do. Chartered ,, ...	151	63			,, Illustrations for Journal ...	640	—		
From the Executors of the late					,, Furniture	80	—		
Hon. Treasurer, ...	203	18	7,247	98	,, Bookbinding	101	45		
					,, Stationery	63	91		
To Subscriptions					,, Salaries	225	—		
For the year ended 31st Dec. 1913	5	—			,, Postages and Petties	167	52		
Do. do. 1914	20	—			,, Books for Society's Library ...	14	14	4.120	69
Do. do. 1915	65	—			,, Balances carried forward :				
Do. do. 1916	900	—			On Fixed Deposit :				
Do. do. 1917	20	—			Mercantile Bank			4,700	—
2 Life Memberships	100	—	1,110	—	On Current Account.				
To Sale of Journals			478	26	Mercantile Bank			429	24
,, Sale of Maps			446	15	Chartered Bank			284	39
,, Refundments			1	53					
,, Bank Interest, Mercantile Bank ...			188	—					
Do. Chartered Bank			62	40					
			9,534	32				9,534	32

Audited, vouchers and counterfoil receipts
and F/D receipts seen and found correct.
W. MAKEPEACE.

R. HANITSCH,
Hon. Treasurer.
January 12th, 1917.

List of Members for 1917.

*Life Members. †Honorary Members.

Patron His Excellency Sir Arthur Young, G.C.M.G. Governor of the Straits Settlements and High Commissioner for the Malay States.

Date of election.	
18 Jan., 1903.	Abbott. Dr. W. L.. 400 South 15th Street. Philadelphia, U. S. A.
21 Sept., 1916.	Abraham, H. C. Survey Dept., Kuala Lumpur.
24 June, 1909.	Adam, Frank, The Straits Trading Co., Singapore.
— 1907.	Adams, Lieut.-Col., the Hon. A. R. Messrs. Adams and Allan, Penang [Vice-President, 1910; 1917].
14 Dec., 1910.	Adams, H. A. Superintendent, of Police and Prisons, Kuching, Sarawak.
20 June, 1910.	Adams, H. Powys, Imber Cross, Thames Ditton, Surrey, England.
22 March, 1917.	Adams, Dr. J. W., Moulmein Road Hospital, Singapore.
22 March, 1917.	Adams, R. H., c/o Messrs. Topham, Jones and Railton, Ltd., Singapore.
10 March, 1909.	Adams, T. S. District Officer, Kuala Krai, Kelantan.
7 Feb., 1910.	Aldworth, J. R. O. Kuala Lumpur.
17 Feb., 1913.	Allen, Rev. George Dexter, Singapore.
3 May, 1914.	Allen, H. C. W., c/o Messrs. Boustead & Co., Singapore.
22 March, 1917.	Allen, P. T., Chinese Protectorate, Singapore.
24 June, 1909.	Allen, Rowland, Beacon Hall, North Cranbrook, Kent, England.
16 Feb., 1914.	Amery, Rev. A. J. Victoria Bridge School, Singapore.
— 1907.	Anderson, E. Messrs. Mansfield and Co., Singapore.
22 Feb., 1911.	Anderson, J. W., Hendra Estate, Sungkai, Perak.
— 1890.	Anthonisz, J. O., C.M.G. England, (Hon. Treasurer, 1894-1896: Vice President 1913).
12 Oct., 1911.	Armstrong, W. R., L. L. D., D. C. L., Messrs. Logan and Ross, Penang.
27 Oct., 1908.	Arthur, J. S. W., Assistant Adviser, Kedah.
4 June, 1908.	*Ayre, C. F. C. High School, Malacca.
3 May, 1915.	Baddeley, F. M., Postmaster General, Singapore.
1 Feb., 1915.	Bain, Norman K. Kuala Langkat.

20 May,	1912.	Baker, A. C., c/o W. Evans, Esq: The Limes, Crowmarsh near Wallingford, Berks, England. (Hon. Librarian 1912-1913).
3 June,	1909.	Banks, C. W. c/o Messrs. John Little & Co., Singapore.
28 Nov.,	1916.	Banks, H. H., Sanitary Board, Seremban.
10 Jan.,	1899.	*Banks, J. E., c/o the American Bridge Co. Ambridge, Pa., U. S. A.
23 June,	1904.	Bartlett, R. J., Inspector of Schools, Singapore.
24 May,	1910.	Bartley, W., Civil Service, Singapore.
20 July,	1914.	Bazell, C. Raffles Institution, Singapore. (Hon. Librarian 1916—17).
24 June,	1909.	Bean, A. W., c/o Messrs. Robinson & Co., Singapore.
27 Jan.,	1910.	Beatty, D. Tavoy, Burma.
16 June,	1913.	Bell, V. G., Forest Department, Kuala Lumpur.
25 Feb.,	1910.	*Berkeley, H., F. M. S. Civil Service.
14 Aug.,	1912.	Bicknell, J. W., c/o General Rubber Co., Medan, Sumatra.
—	1885.	Bicknell, W. A., Nork House, 4 Earls Road, Bournemouth, W., England.
4 June,	1908.	*Bishop, Major C. F., R. A.
27 Jan.,	1890.	*Blagden, C. O. India Office Library, Whitehall, London, S. W. (Hon. Secretary, 1896).
13 Feb.,	1917.	Blair, R. Balfour, Sungei Talam Estate, Kuantan, Pahang.
—	1884.	Bland, R. N., C. M. G. Broadfields, Letchworth, Herts, England. (Council, 1898-1900: Vice-President, 1907—1909).
5 May,	1914.	Bluett, H. A. Newton, Lebong Loetit, Benkoelen, Sumatra; or Oaklea, Chaucer Road, Bedford, England.
14 Dec.,	1910.	Boult, F. F., Bintulu, Sarawak.
17 Jan.,	1910.	Boyd, D. T., c/o Messrs. Boustead & Co., Singapore.
16 Aug.,	1915.	Boyd-Walker, J. W., Atbara Estate, Kuantan, Pahang.
13 Jan.,	1913.	Braddell, R. St. J., Messrs. Braddell Bros., Singapore.
7 Feb.,	1910.	Brison, Clifford S., 32 Archfield Road, Cotham, Bristol, England.
23 Sept.,	1897.	Brockman, Sir Edward L., K. C. M. G., Kuala Lumpur.
1 April,	1910.	Brooke, J. R., Government Monopolies Department, Keppel Harbour, Singapore.
13 Jan.,	1909.	Brooks, C. J. Lebong Tandai, Benkoelen, Sumatra.

8 Sept., 1909. Brown, A. V., Johore.
16 Aug., 1915. Brown, C. C., F. M. S. Civil Service, Kuala Lumpur.
27 Jan., 1910. Brown, D. A. M., Messrs. Brown, Phillips and Stewart, Penang.
1 Dec., 1913. *Bryan, J. M., Kuching, Sarawak.
26 March, 1887. Bryant, Hon. A. T., (Council, 1907: 1910: Vice-President, 1912, 1914-1916).
28 Oct., 1912. Burkill, I. H., Botanic Gardens, Singapore. (Council, 1913: Hon. Secretary, 1914-1917).
29 Sept., 1913. *Caldecott, Andrew, Secretariat, Kuala Lumpur.
16 Jan., 1916. Campbell, Professor J. Argyll, M. D., D. Sc. Medical School, Singapore (Council, 1917).
16 Feb., 1914. Cardew, G. E., 3/4th Devon Depôt Battalion, Exmouth, Devon, England.
3 Jan., 1909. Carver, C. I., Messrs. Donaldson and Burkinshaw, Singapore.
27 Jan., 1910. Chancellor, Capt. A. R., Police Office, Singapore.
15 Jan., 1906. Chapman, W. T. Ipoh, Perak.
1 Dec., 1913. *Choo Kia Peng, Kuala Lumpur.
16 March, 1911. Clayton, T. W., Temerloh, Pahang.
2 Feb., 1914. Clement, W. R. T., Sarawak.
22 March, 1917. Clifford, G. F. W., Kuala Pilah, Negri Sembilan.
13 Jan., 1913. Chulan, Raja, bin Ex-Sultan Abdullah, Taiping. Perak.
30 Jan., 1894. †Collyer, W. R., I. S. O. Hackford Hall, Reepham, Norfolk, England. (Council 1904: Vice President, 1897-1900, 1902, 1904-1905: Hon. Member, 1906).
1 March, 1897. *Conlay, W. L., Kuala Lumpur.
27 Jan., 1899. Cook, Rev. J. A. B., Gilstead, Singapore.
— 1910. Cook, Hon. W. Wallace, c/o The Straits Trading Co., Singapore.
22 March, 1917. Crichton, R., The Secretariat, Singapore.
13 Feb., 1917. Cross, Rev. W. Cavanagh Road, Singapore.
14 Aug., 1912. Crossle, Frank J., New Zealand Malay Rubber Co., Kota Bharu, Kelantan.
27 Jan., 1910. Croucher, Dr. F. B., General Hospital, Singapore.
22 March, 1917. Cubitt, G. E. S., Conservator of Forests, S. S. and F. M. S., Kuala Lumpur.
13 Jan., 1905. Dallas, Hon. F. H. Sarawak.
24 May, 1910. Daly, M. D., Batu Gajah, Perak.
18 July, 1891. Dane, Dr. R., Penang.
27 Jan., 1910. Darbishire, Hon. C. W., c/o Messrs. Paterson Simons & Co., Singapore.

— 1907. Dent, Dr. F. Government Analyst, Singapore.

1 Dec., 1911. Derry, R., 57, Ennerdale Road, Kew Gardens, Surrey, England.

5 Nov., 1903. *Deshon, H. F., Southfield, Combe Down, Bath, England.

23 Sept., 1897. Dickson, E. A., Grik, Upper Perak.

28 July, 1905. Douglas, Hon. R. S. Baram, Sarawak.

30 Nov., 1914. Duncan, W. Wallace, Assistant Censor, General Post Office, Penang.

27 Jan., 1910. Dunman, W., Grove Estate, Tanjong Katong, Singapore.

16 Aug., 1915. *Dussek, O. T., Malay College, Malacca.

13 Oct., 1899. Edmonds, R. C., F. M. S. Civil Service, Seremban.

— 1885. Egerton, His Excellency Sir W., K. C. M. G., Government House, British Guiana.

13 Nov., 1901. Elcum, J. B., Singapore.

27 Jan., 1910. Ellerton, H. B., F. M. S. Civil Service, Kuala Kangsar, Perak.

3 June, 1909. Ellis, Sir Evelyn C., Messrs. Drew and Napier, Singapore.

16 Jan., 1916. Ellis, J. W. Cundell, F. M. S. Civil Service, Kuala Lumpur.

27 Jan., 1910. Engel, L., Netherlands Trading Society, Batavia.

25 March, 1913. Ermen, C., Kuching, Sarawak.

27 Jan., 1910. Evans, W., The Limes, Crowmarsh near Wallingford, Berks, England.

17 March, 1890. Everett, H. H., Santubong, Sarawak.

7 Feb., 1910. Falshaw, Dr. P. S., Government Veterinary Department, Singapore.

8 Sept., 1909. Farrer, R. J., Kota Bharu, Kelantan.

28 Oct., 1912. Faulkner, Dr. S. B. Christmas Island.

26 Jan., 1911. *Ferguson-Davie, Rt. Rev. Dr. C. J., Bishop of Singapore (Council, 1912-1913).

8 Sept., 1909. Ferrier, J. G., c/o Borneo Company, Soerabaya, Java.

22 March, 1917. Finlayson, Dr. G., Singapore.

24 May, 1910. Firmstone, H. W., Education Department, Singapore.

12 Jan., 1900. Fleming, T. C., Larut, Taiping, Perak.

2 Sept., 1897. *Flower, Capt. S. S., Zoological Gardens, Ghizeh, Egypt.

23 June, 1904. *Flower, Lieut.-Col. V. A., 42, Earls Court Square, London, S. W. (Council 1905-1912).

16 Jan., 1916. Ford, H. W., Municipal Offices, Malacca.

19 Aug.,	1908.	Freeman, D., 9, Court of Justice, Kuala Lumpur.
—	1897.	Freer, Dr. G. D.
27 Jan.,	1910.	*Frost, Meadows, S. S. Civil Service.
14 Aug.,	1912.	Gallagher, W. J., General Rubber Co., Medan, Sumatra.
23 Jan.,	1903.	†Galloway, Dr. D. J., British Dispensary, Singapore. (Vice-President; 1906—1907; President, 1908—1913; Hon. Member, 1917).
26 May,	1897.	*Gerini, Lt.-Col. G. E.
8 Sept.,	1903.	Gibson, W. S., High Court, Kedah.
28 May,	1902.	*Gimlette, Dr. J. D., 5, Merton Road, Southsea, England.
4 Jan.,	1916.	Glennie, Dr. J. A. R., Municipal Offices, Singapore.
21 Sept.,	1916.	Goodman, A. M., Ipoh, Perak.
18 March,	1909.	Goulding, R. R., Survey Department, Kuala Lumpur.
27 Jan.,	1910.	Gray, N. T., Taiping, Perak.
13 Jan.,	1916.	Gupta, Shiva Prasad, Nandansahu Street, Benares City, United Provinces, India.
14 Sept.,	1911.	Griffiths, J. Superintendent of Surveys, Johore Bahru.
12 Jan.,	1900.	Haines, Rev. F. W.
—	1886.	Hale, A., Dachurst, Hildenborough, Kent, England.
15 July,	1907.	Hall, G. A., Alor Star, Kedah.
5 May,	1914.	Hall, J. D., Batu Pahat, Johore.
26 Jan.,	1911.	Hallifax, F. J., Municipal Offices, Singapore.
12 April,	1915.	Hamilton, A. W. H., Central Police Office, Penang.
16 March,	1911.	Handy, Dr. J. M., St. Mary's Dispensary, 75, Hill Street, Singapore.
11 Sept.,	1895.	Hanitsch, Dr. R., Raffles Museum, Singapore. (Council, 1897, 1907-1909: Hon. Treasurer, 1898-1906, 1910-1911, 1914-1916: Hon: Secretary, 1912-1913).
3 June,	1909.	Harrington, A. G., Municipal Offices, Singapore.
5 Jan.,	1904.	*Haynes, A. S., Kuala Kangsar, Perak.
24 June,	1909.	Hennings, W. G., c/o Messrs. Mansfield & Co., Singapore.
—	1910.	Hewan, E. D., c/o Messrs. Boustead & Co., Singapore.

—	1878.	Hill, E. C., The Manor House. Normandy near Guildford, England.
12 Oct.,	1911.	Hood-Begg, Hon. A., c/o Messrs. Guthrie and Co., Singapore.
22 Nov.,	1897.	Hose, E. S., District Officer, Lower Perak.
A founder,	1878.	†Hose, Rt. Rev. Bishop G. F., Wyke Vicarage, Normandy near Guildford, England. (Vice-President, 1890-1892: President, 1894-1907).
7 Oct.,	1891.	Hoynck van Papendrecht, P. C., 83, Antonie Duyckstraat, The Hague, Holland.
20 Oct.,	1909.	Hubback, T. R., Pertang, Jelebu, Negri Sembilan.
20 Oct.,	1909.	Hughes, J. W. W., Temerloh, Pahang.
15 July,	1907.	Humphreys, J. L., Trengganu.
27 Jan.,	1910.	Jackson, Col. H. M., c/o the Survey Department, Kuala Lumpur.
21 Sept.,	1916.	James, Hon. F. S., C. M. G., Colonial Secretary, Singapore.
27 Jan.,	1910.	Jamieson, Dr. T. Hill, 4 Bishop Street, Penang.
26 March,	1907.	Janion, E. M., c/o English, Scottish and Australian Bank, 38, Lombard Street, London, E. C.
1 Dec.,	1911.	Jelf, A. S., Ipoh, Perak.
—	1910.	Johnson, B. G. H., Telok Anson.
15 June,	1911.	Johnson, Hon. H. S. B., Limbang, via Labuan.
27 Jan.,	1910.	Jones, H. W., Kuantan, Pahang.
17 Feb.,	1913.	Jones, S. W., Kuantan, Pahang.
26 May,	1912.	Jones, Wyndham, Miri, Sarawak.
16 April,	1912.	Jones, W. R., Geological Department, Batu Gajah, Perak.
21 Sept.,	1916.	Kamaralzaman, Raja, bin Raja Mansur, Rembau.
5 Oct.,	1897.	Kehding, Dr.
20 Oct.,	1909.	Keith, Dr. R. D., Medical School, Singapore. (Council, 1911-1912, 1914-1916).
10 Feb.,	1916.	Kellagher, G. B., S. S. Civil Service, Singapore.
3 June,	1909.	Kemp, W. Lowther, c/o Messrs. F. W. Barker and Co., Singapore.
13 Jan.,	1913.	Kempe, John Erskine, Kuala Kangsar, Perak.
23 May,	1906.	Kinsey, W. E., Forest House, Seremban.
27 Jan.,	1910.	Kirk, Dr. J., Penang.
29 Jan..	1900.	Kloss, C. Boden, The Museum, Kuala Lumpur. (Council, 1904-1908).

12 April, 1915.	Knight, Valentine, Raffles Museum, Singapore.
26 March, 1907.	Kriekenbeek, J. W., Taiping, Perak.
31 Jan., 1902.	Laidlaw, G. M., Pekan, Pahang.
16 Feb., 1914.	Lambourne, J., Castleton Estate, Telok Anson, Perak.
5 May, 1914.	Laville, L. V. T., Balik Pulau, Penang.
28 May, 1902.	†Lawes, Rev. W. G., Port Moresby, New Guinea.
5 Oct., 1906.	Lawrence, A. E., Kuching, Sarawak.
29 Sept., 1913.	Leicester, Dr. W. S., Pekan, Pahang.
22 March, 1917.	Lemberger, V. V., c/o United Engineers, Ltd., Singapore.
28 March, 1894.	*Lemon, Hon. A. H., Seremban. (Vice-President, 1916-17).
30 May, 1890.	Lewis, J. E. A., B. A., 698, Harada Mura, Kobe, Japan.
16 Aug., 1915.	Lewton-Brain, L. Director of Agriculture, Kuala Lumpur.
20 May, 1897.	Lim Boon Keng, Hon. Dr. M. D., c/o The Dispensary, Singapore.
12 April, 1915.	Lim Cheng Law, Millview, Penang.
27 Jan., 1910.	Lloyd, J. T., c/o Messrs. Powell and Co., Singapore.
16 Feb., 1914.	Lornie, J. Land Office, Singapore.
8 June, 1909.	Low, H. A., c/o Messrs. Adamson, Gilfillan and Co., Penang.
22 Jan., 1896.	Luering, Prof. Dr. H. L. E., Wittelsbacher Allee, Frankfurt am Main, Germany.
27 Jan., 1910.	Lupton, Harry, Bukit Mertajam, Province Wellesley.
26 June, 1907.	Lyons, Rev. E. S., 82, Isla de Remere, Manila.
3 June, 1909.	McArthur, M. S. H., Kuala Lumpur.
23 Sept., 1897.	McCausland, C. F., Port Dickson.
25 Feb., 1910.	*MacFadyen, Eric, Kuala Lumpur, Selangor.
24 July, 1908.	Mackray, W. H., Kuala Lumpur.
1 April, 1910.	MacLean, L., Kuala Lumpur.
21 April, 1904.	Mahomed, Hon. Datoh, bin Mahbob, Johor Bahru, Johor.
8 Sept., 1903.	Makepeace, W., c/o Singapore Free Press, Singapore. (Council, 1914-1916: Hon. Librarian, 1910-1912: Hon. Treasurer, 1909; Vice-President, 1917).
15 April, 1908.	Main, T. W., Cheng Estate, Malacca.
10 Feb., 1916.	Mann, W. E., Hotel Pavillon, Samarang, Java.
12 Feb., 1902.	Marriott, Hon. H., The Treasury, Singapore. (Council, 1907-1908, 1910-1913, 1915-1917).
24 June, 1909.	Marsh, F. E., Municipal Offices, Singapore.

12 May,	1909.	Marshall, Harold B., Bintang Estates, c/o Messrs. F. W. Barker & Co., Singapore.
15 July,	1907.	*Marriner, J. T., Kuantan, Pahang.
5 May,	1914.	Martin, T. A., c/o Messrs. Kennedy and Co., Penang.
18 June,	1903.	Maxwell, Eric, Boulogne.
5 Nov.,	1903.	Maxwell, W. George, C. M. G., Taiping. (Council, 1905, 1915: Vice-President, 1916).
16 Dec.,	1909.	May, C. G., Deputy Colonial Engineer, Penang.
16 Feb.,	1914.	Mead, J. P.
24 July,	1908.	Millard, H., c/o Messrs. Donaldson and Burkinshaw, Singapore.
7 Feb.,	1910.	Miller, T. C. B., Fairlie, Nassim Road, Singapore.
29 Sept.,	1913.	Mollett, H. B., Tiroi P. O., Negri Sembilan.
7 Feb.,	1910.	Money, A. W. Kirle, Asiatic Petroleum Co., Kuala Lumpur, Selangor.
8 Sept.,	1909.	*Moulton, Capt. J. C., Fort Canning, Singapore.
11 Oct.,	1915.	*Mundell, H. D., c/o Messrs. Sisson and Delay, Singapore.
15 June,	1911.	Munro, R. W., Morib, Selangor.
17 Feb.,	1913.	Murray, Rev. W., M. A., 1 Gilstead Road, Singapore.
10 Feb.,	1916.	Myers, Frank H., Asiatic Petroleum Co., Singapore.
22 March,	1917.	Nagle, Rev. J. S., M. A. Principal, Anglo-Chinese School, Singapore.
8 Sept.,	1909.	Nathan, J. E., Raub, Pahang.
25 Feb.,	1910.	Niven, W. G., 11, Derby Crescent, Kelvinside, Glasgow, Great Britain.
9 May,	1900.	Norman, Henry, Kelantan.
5 Jan.,	1906.	Nunn, B., Malacca.
26 Jan.,	1911.	O'May, J., Kuala Kangsar, Perak.
10 Feb.,	1916.	Ong Boon Tat, 29, South Canal Street, Singapore.
17 Feb.,	1913.	Overbeck, H., Trial Bay, N. S. W., Australia.
2 Feb.,	1914.	Panyarjun, Samahu, The Royal State Railways Dept. Standard Gauge, 196, Hluang Road, Bangkok, Siam.
27 Oct.,	1908.	Parr, The Hon. C. W. C., Residency, Kuala Lipis, Pahang.
20 Oct.,	1909.	Peacock, W. Chinese Protectorate, Singapore.
22 March,	1917.	Pears, R., c/o Messrs. F. W. Barker & Co., Singapore.
4 Jan.,	1910.	Peirce, R.
5 May,	1914.	Pepys, W. E., Pasir Puteh, Kelantan.
—	1878.	†Perham, the Ven. Archdeacon J. Chard, Somerset, England.

3 June, 1909. Plumpton, M. E., c/o Messrs. Adamson Gilfillan and Co., Singapore.

25 Feb. 1910. Pratt, E., The East India United Service Club, 16, St. James' Square London, S. W.

22 Jan., 1912. Price, William Robert, B. A., F. L. S. Pen Moel, Chepstow, England.

22 March, 1906. Pringle, R. D., The Y. M. C. A. buildings, Singapore.

5 Oct., 1906. Pykett, Rev. G. F., M. E. Mission, Kuala Lumpur.

3 May, 1915. Raggi, J. G., Phlab Phla Jai Road, Bangkok, Siam.

10 Feb., 1916. Rayman, L. Assistant District Officer, Raub, Pahang.

27 Jan., 1910. *Reid, Dr. Alfred, Parit Buntar.

27 Jan., 1910. Reid, Alex., c/o Messrs. McAlister and Co., Singapore.

20 Oct., 1909. Richards, D. S.

15 June, 1911. Richards, R. M., The Caledonia Estate, Province Wellesley.

27 Jan., 1890. †Ridley, H. N., C. M. G., F. R. S., 7, Cumberland Road, Kew Gardens, Surrey, England. (Council, 1894-1895: Hon. Secretary, 1890-1893, 1897-1911: Hon. Member, 1912).

14 Sept., 1911. Robertson, G. H. M.

14 Aug., 1912. Robertson, J., c/o Messrs. Guthrie and Co., Singapore.

16 March, 1911. Robinson, H., c/o Messrs. Swan and Maclaren, Singapore. (Council, 1916-17).

17 March, 1904. Robinson, H. C., The Museum, Kuala Lumpur. (Vice-President, 1909; 1913).

10 Feb., 1916. Rogers, A., Public Works Department, Singapore.

22 Jan., 1896. Rostados, E., Gali Rubber Estate, Raub, Pahang. (Council, 1901).

1 March, 1897. *Rowland, W. R., Pulau Bulang, via Singapore.

29 Sept., 1913. Runciman, Rev. W., M. A., B. D.

7 April, 1909. Sanderson, Mrs. R.

— 1878. †Sarawak, His Highness The Raja of, Kuching, Sarawak.

10 Feb., 1916. †Sarawak, His Highness The Raja Muda of, Kuching, Sarawak.

— 1885. †Satow, Sir Ernest M., Beaumont, Ottery St. Mary, Devon, England.

22 Jan., 1896. Saunders, Hon. C. J., Official Assignee, Singapore. (Vice President, 1910-1911, 1914-1915: President, 1916).

17 March, 1904.	Schwabe, E. M., Cheras Estate, Kajang, Selangor.
27 Jan., 1910.	Scott, R., District Court, Singapore.
5 Oct., 1906.	Scrivenor, J. B., Batu Gajah, Perak.
26 March, 1888.	Seah Liang Seah, c/o Chop Chin Hin, Singapore.
12 April, 1915.	See Tiong Wah, c/o Hongkong and Shanghai Bank, Singapore.
30 Jan., 1894.	Shellabear, Rev. Dr. W. G., D. D. 805 Beaumont Avenue, Govans, Maryland, U. S. A. (Council, 1896-1901, 1904: Vice-President, 1913: President, 1914-1915).
3 June, 1909.	Sims, W. A., c/o Commercial Union Assurance Co., Singapore.
22 March, 1917.	Shillitoe, G., Kuantan, Pahang.
10 Nov., 1909.	Skinner, Capt. R. McK.
20 May, 1912.	Smith, Prof. Harrison W., Massachusetts Institution of Technology, Boston, Mass., U.S.A.
27 Jan., 1910.	Song Ong Siang, c/o Messrs. Aitken and Ong Siang, Singapore.
27 Jan., 1910.	Spakler, H. Netherlands Embassy, New York, U. S. A.
20 June, 1910.	StClair, W. G., c/o Singapore Free Press, Singapore. (Council, 1889, 1901, 1903-1906).
10 Nov., 1909.	Steadman, V. c/o Messrs. Swan and Maclaren, 5, Raffles Place, Singapore.
24 May, 1910.	Steedman, R. S., Duff Development Co. Ltd., Kuala Tui, Kelantan.
27 Jan., 1910.	Stevens, K. A. c/o Messrs. Caldbeck, MacGregor and Co., Singapore.
27 Jan., 1910.	Still, A. W., c/o Straits Times, Singapore. (Council, 1914-1915).
13 Feb., 1917.	Stirling, W. G., Government Monopolies Department, Malacca.
3 May, 1915.	Strickland, Dr. C. Malaria Bureau, Kuala Lumpur.
14 Sept., 1911.	Stuart, E. A. G., Alor Star, Kedah.
24 May, 1910.	Sturrock, A. J., Batu Gajah, Perak.
22 March, 1917.	Sumner, H. L. Inspector of Schools, Perak, Taiping.
25 Feb., 1910.	Sunner, J. H., c/o The Straits Steamship Co., Singapore.
22 Jan., 1912.	Swayne, J. C., Limbang, via Labuan, Sarawak.
4 June, 1908.	Tan Cheng Lock, 59, Heeren Street, Malacca.
27 Jan., 1910.	Tan Jiak Kim, C. M. G., Panglima Prang, River Valley Road, Singapore.

16 June,	1913.	Taylor, Lt. Clarence J., 11th Battalion King's Own Yorkshire Light Infantry.
10 Nov.,	1909.	Thunder, M., Tekka Ltd., Gopeng, Perak.
14 Aug.,	1914.	Tracy, F. D., c/o The Standard Oil Co., Penang.
—	1887.	van Beuningen van Helsdingen, Dr. R., 484/2, Bukit Timah Road, Singapore. (Hon. Librarian, 1914-1915).
3 June,	1909.	Ward, A. B., Semanggang, Sarawak.
6 July,	1896.	Watkins, A. J. W., c/o Messrs. Swan and Maclaren, Singapore.
10 Feb.,	1916.	Watkins, Mrs. Legrew, c/o Messrs. Watkins & Co., Singapore.
13 Jan.,	1916.	Watson, J. G., Forest Department, Kuala Lumpur.
18 Oct.,	1916.	Watson, Dr. Malcolm, Klang, Selangor.
27 Jan.,	1910.	Weld, F. J., Johore Bahru.
15 July,	1907.	Welham, H. c/o The Straits Echo, Penang.
15 April,	1912.	Wharton, S. L., c/o The Singapore Club, Singapore.
27 Jan.,	1910.	Whitehead, C. B., Police Office, Butterworth, Province Wellesley.
28 Oct.,	1912.	Williams, F., Rose Cottage, St. Agnes, Cornwall, England.
25 March,	1913.	Williams, R. B., Bau, Sarawak.
27 Jan.,	1910.	Williams, S. G. Municipal Offices, Singapore.
27 Jan.,	1910.	*Winkelmann, H. Malacca Street, Singapore.
24 Nov.,	1904.	Winstedt, R. O.
25 Feb.,	1910.	Wolferstan, L. E. P., The Residency, Malacca.
28 May,	1902.	Wolff, E. C. H., The Secretariat, Singapore.
4 June,	1908.	*Wood, E. G., Batu Gajah, Perak.
16 June,	1913.	Wood, W. L., Jin Jang Estate, Kepong, Selangor.
21 Sept.,	1916.	Woollett, G. F. C., Klagaw, Labuk and Sugut District, B. N. B.
14 Sept.,	1911.	Worsley-Taylor, F. E., c/o Messrs. Vade and Co., Singapore.
12 April,	1915.	*Worthington, A. F., Kuantan, Pahang.
5 May,	1914.	Wyley, A. J., Lebong Tandai, Benkoelen, Sumatra.
25 Feb.,	1910.	Wymodzeff, A de.
26 April,	1916.	Young, E. Stuart, Kinarut Estate, via Jesselton, B. N. B.
24 Nov.,	1904.	*Young, H. S., Bau, Sarawak.

RECIPIENTS of the Society's PUBLICATIONS, not being MEMBERS. (Exchanges with enemy countries, with Belgium and with the German Asiatic Society, Tokyo, being in suspense).

AMSTERDAM. Nederlandsch Aardrijkskundig Genootschap, Domselaerstraat, 19, Amsterdam, Netherlands, in exchange for that Society's Tijdschrift.

AMSTERDAM. Koloniaal Instituut, Amsterdam (formerly of Haarlem), in exchange for that Institute's publications.

BALTIMORE. The Johns Hopkins University, Baltimore, U. S. A. in exchange for the University's Circulars, Studies, and American Journal of Philology.

BANGKOK. The Vajeranana National Library, Bangkok, in exchange, for the Library's publications.

BATAVIA. Bataviaasch Genootschap van Kunsten en Wetenschappen, in exchange for that Society's Tijdschrift voor Indische Taal Land- en Volkenkunde and other publications.

BATAVIA. Mijnwezen in Nederlandsch-Indie, Batavia (Chef van het Mijnwezen), in exchange for the Jaarboek of the Department.

BERKELEY. University of California, Berkeley, Cal. U. S. A. (Manager of the University Press), in exchange for the University's "Publications."

BERLIN. Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, Berlin S. W., Königgratzer Strasse 120, in exchange for the Zeitschrift für Ethnologie.

BERLIN. Gesellschaft für Erdkunde, 23, Wilhelmstrasse, Berlin, in exchange for that Society's Zeitschrift.

BOMBAY. Royal Asiatic Society, Bombay Branch, Town Hall, Bombay, India, in exchange for the Branch's Journal.

BREMEN. Geographische Gesellschaft, Bremen, in exchange for that Society's Geographische Blätter.

BRUSSELS. Société Belge d'Etudes Coloniales, Rue de Stassart 34, Bruxelles, Belgium, in exchange for that Society's Bulletin.

CALCUTTA. Geological Survey of India, Indian Museum, Calcutta (Director) for the Survey's Records and Memoirs.

CHICAGO. Field Museum of Natural History, Chicago, U. S. A. in exchange for the Museums "Publications."

COLOMBO. Royal Asiatic Society, Colombo Branch, Colombo, Ceylon, in exchange for the Branch's Journal.

GIESSEN. Oberhessische Gesellschaft für Natur und Heilunde, Giessen, Germany, in exchange for that Society's Berichten.

GOA. The Government of the Portuguese Indies, Goa, India (O Director, Imprensa National), in exchange for the Journal "O Oriente Portugues."

HAMBURG. Hamburgische Wissenschaftlichen Anstalten, in exchange for the Jahrbuch.

HANOI. Ecole Française d'Extrême Orient, Hanoi, Indo-China (Director), in exchange for the School's Bulletin.

HALLE. Kaiserliche Leop.-Carol. Deutschen Akademie der Naturforscher, Halle, Germany, in exchange for that Society's Abhandlungen.

HAGUE. Koninklijk Instituut voor de Taal, Land- en Volkenkunde van Ned.-Indie, van Galenstraat 14, 'S-Gravenhage, Netherlands, in exchange for that Society's Bijdragen.

HAVRE. Société de Geographie Commerçiale du Havre, 131, Rue de Paris, le Havre, France, in exchange for that Society's Bulletin.

HONOLULU. Bernice Pauahii Bishop Museum, Honolulu, Hawaiian Islands, (Librarian) in exchange for the Museum's Occasional Papers, and other publications.

KEW. Royal Botanic Gardens, Kew, Surrey, England, in exchange for official publications of the Gardens.

HELSINGFORS. Finska Vetenskaps Societaten, Helsingfors, Finland, in exchange for the Society's Bidrag till Kannedom, Acta and Ofversigt.

KUALA LUMPUR. The Selangor Museum, Kuala Lumpur, in exchange for the Journal of the F. M. S. Museums.

KUALA KANGSAR. Committee for Malay Studies (pays for publications).

LAHORE. The Panjab Historical Society, The Museum, Lahore, Panjab, India, in exchange for that Society's Journal.

LINCOLN. University of Nebraska, Lincoln, Nebraska, U. S. A. in exchange for that University's publications.

LEIPZIG. Museum für Völkerkunde, Leipzig, Germany, in exchange, for the Museum's Jahrbuch.

LISBON. Sociedade de Geographia de Lisboa, Rue Eugenio dos Santos, Lisboa, Portugal, (Secretary), in exchange for the Society's Bulletin.

LONDON. Royal Anthropological Society of Great Britain and Ireland, 50, Great Russell Street, London, W. C. in exchange for the Society's Journal.

LONDON. Royal Asiatic Society, 22, Albemarle Street, London, W. (Secretary) in exchange for the Society's Journal.

LONDON. Royal Colonial Institute, Northumberland Avenue, London, W. C. (Librarian) in exchange for "United Empire."

MALACCA. The Malacca Library, Malacca (pays for publications).

MANILA. The Bureau of Science, Manila, (Director) in exchange for the Philippine Journal of Science.

MARSEILLES. Société de Geographie et d'Etudes Coloniales, Rue de Noailles 5, Marseille, France, in exchange for the Society's Bulletin.

MEXICO. Instituto Geologico de Mexico, Mexico City, in exchange for their Parergones and Boletin.

NEW YORK. American Philosophical Society, 104, South Fifth Street, New York, U. S. A. in exchange for the Society's Proceedings.

OTTAWA. The Geological Survey, Department of Mines, Sussex Street, Ottawa, Canada (Librarian) in exchange for the Department's publications.

PARIS. Société Asiatique de Paris, Rue Bonaparte, 28, Paris, in exchange for the Journal Asiatique.

PARIS. Société de Geographie, 120, Boulevard St. Germain, Paris, in exchange for the Society's Bulletin entitled "La Geographie."

PARIS. Société de Geographie Commerçiale de Paris, 8, Rue de Tournon, Paris, in exchange for the Society's Bulletin.

PHILADELPHIA. Academy of Natural Sciences, Philadelphia, U. S. A. (Secretary) in exchange for the Academy's Proceedings.

ROME. Reale Societe Geografica, Via del Plebiscito, 102, Roma, Italy, in exchange for the Society's Bolletino.

ST. LOUIS. Academy of Natural Sciences, St. Louis, Mo., U. S. A. in exchange for the Society's Transactions.

ST. LOUIS. Missouri Botanical Garden, St. Louis, Mo. U. S. A. (Director), in exchange for the Garden's Annals.

SARAWAK. The Sarawak Museum, Borneo, in exchange for the Museum's Journal.

SIMLA. Director-General of Archaeology, Simla, India, in exchange for the Archaeological Survey's publications.

SINGAPORE. The Raffles Museum, Singapore.

SHANGHAI. Royal Asiatic Society, N. China Branch, Shanghai, China, in exchange for the Society's Journal.

SYDNEY. Royal Society of New South Wales, Elizabeth Street, Sydney, New South Wales, in exchange for the Society's Proceedings.

TOKYO. Asiatic Society of Japan, 6, Babasaki, Kojimachi, Tokyo, Japan. (Hon. Treasurer) in exchange for the Society's Transactions.

TOKYO. Deutsche Gesellschaft für Natur und Völkerkunde Ostasiens, Tokyo, Japan, in exchange for the Society's Mittheilungen.

UPSALA. The University, Bibliothèque de l'Université Royale, Uppsala, Sweden, in exchange for that University's Aarskrift.

VIENNA. Anthropologische Gesellschaft in Wien, I. Burgring 7 (An die Anthropologisch Ethnographische Abtheilung der K. K. Naturhistorischen Hofmuseums, Wien 1, Burgring 7—für die Anthropologische Gesellschaft)—in exchange for the Society's Mittheilungen.

ZURICH. Naturforschende Gesellschaft (Bibliothéque centrale, Bureau d'échange de la Société d'histoire naturelle). Zurich, Switzerland, in exchange for that Society Vierteljahrschrift.

[Closed March 24th, 1917.]

RULES
# of the Straits Branch
OF THE
Royal Asiatic Society.

I. Name and Objects.

1. The name of the Society shall be 'The Straits Branch of the Royal Asiatic Society.'

2. The objects of the Society shall be:—

(a) The increase and diffusion of knowledge concerning British Malaya and the neighbouring countries.
(b) the publication of a Journal and of works and maps.
(c) the formation of a library of books and maps.

II. Membership.

3. Members shall be of two kinds—Ordinary and Honorary.

4. Candidates for ordinary membership shall be proposed and seconded by members and elected by a majority of the Council.

5. Ordinary members shall pay an annual subscription of $5 payable in advance on the first of January in each year. Members shall be allowed to compound for life membership by a payment of $50.

6. On or about the 30th of June in each year the Honorary Treasurer shall prepare and submit to the Council a list of those members whose subscriptions for the current year remain unpaid. Such members shall be deemed to be suspended from membership until their subscriptions have been paid, and in default of payment within two years shall be deemed to have resigned their membership.

No member shall receive a copy of the Journal or other publications of the Society until his subscription for the current year has been paid.

7. Distinguished persons and persons who have rendered notable service to the Society may on the recommendation of the Council be elected Honorary members by a majority at a General meeting. They shall pay no subscription, and shall enjoy all the privileges of a member except a vote at meetings and eligibility for office.

III. Officers.

8. The officers of the Society shall be:—

A President.
Three Vice Presidents, resident in Singapore, Penang and the Federated Malay States respectively.
An Honorary Treasurer.
An Honorary Secretary.
An Honorary Librarian.
Four Councillors.

These officers shall be elected for one year at the annual General Meeting, and shall hold office until their successors are appointed.

9. Vacancies in the above offices occurring during any year shall be filled by a vote of majority of the remaining officers.

IV. Council.

10. The Council of the Society shall be composed of the officers for the current year, and its duties and powers shall be:—

(a) to administer the affairs, property and trusts of the Society.

(b) to elect ordinary members and to recommend candidates for election as Honorary members of the Society.

(c) to obtain and select material for publication in the Journal and to supervise the printing and distribution of the Journal.

(d) to authorise the publication of works and maps at the expense of the Society otherwise than in the Journal.

(e) to select and purchase books and maps for the Library.

(f) to accept or decline donations on behalf of the Society.

(g) to present to the Annual General Meeting at the expiration of their term of office a report of the proceedings and condition of the Society.

(h) to make and enforce bye-laws and regulations for the proper conduct of the affairs of the Society. Every such bye-law or regulation shall be published in the Journal.

11. The Council shall meet for the transaction of business once a month and oftener if necessary. Three officers shall form a quorum of the Council.

V. General Meetings.

12. One week's notice of all meetings shall be given and of the subjects to be discussed or dealt with.

13. At all meetings the Chairman shall in the case of an equality of votes be entitled to a casting vote in addition to his own.

14. The Annual General Meeting shall be held in February in each year. Eleven members shall form a quorum.

15. (i) At the Annual General Meeting the Council shall present a Report for the preceding year and the Treasurer shall render an account of the financial condition of the Society. Copies of such Report and account shall be circulated to members with the notice calling the meeting.

(ii) Officers for the current year shall also be chosen.

16. The Council may summon a General Meeting at any time, and shall so summon one upon receipt by the Secretary of a

written requisition signed by five ordinary members desiring to submit any specified resolution to such meeting. Seven members shall form a quorum at any such meeting.

17. Visitors may be admitted to any meeting at the discretion of the Chairman but shall not be allowed to address the meeting except by invitation of the Chairman.

VI. Publications.

18. The Journal shall be published at least twice in each year, and oftener if material is available. It shall contain material approved by the Council. In the first number in each year shall be published the Report of the Council, the account of the financial position of the Society, a list of members, the Rules, and a list of the publications received by the Society during the preceding year.

19. Every member shall be entitled to one copy of the Journal, which shall be sent free by post. Copies may be presented by the Council to other Societies or to distinguished individuals, and the remaining copies shall be sold at such prices as the Council shall from time to time direct.

20. Twenty-four copies of each paper published in the Journal shall be placed at the disposal of the author.

VII. Amendments to Rules.

21. Amendments to these Rules must be proposed in writing to the Council, who shall submit them to a General Meeting duly summoned to consider them. If passed at such General Meeting they shall come into force upon confirmation at a subsequent General Meeting or at an Annual General Meeting.

Affiliation Privileges of Members.

Royal Asiatic Society. The Royal Asiatic Society has its headquarters at 22, Albemarle Street, London W., where it has a large library of books, and MSS. relating to oriental subjects, and holds monthly meetings from November to June (inclusive) at which papers on such subjects are read.

2. By rule 105 of this Society all the Members of Branch Societies are entitled when on furlough or otherwise temporarily resident within Great Britain, and Ireland, to the use of the Library as Non-Resident Members and to attend the ordinary monthly meetings of this Society. This Society accordingly invites Members of Branch Societies temporarily resident in Great Britain or Ireland to avail themselves of these facilities and to make their home addresses known to the Secretary so that notice of the meetings may be sent to them.

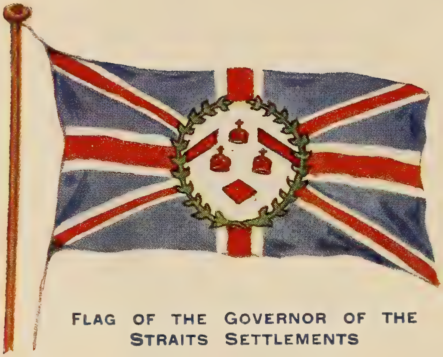
3. Under rule 84, the Council of the Society is able to accept contributions to its Journal from Members of Branch Societies, and other persons interested in Oriental Research, of original articles, short notes, etc., on matters connected with the languages, archæology, history, beliefs and customs of any part of Asia.

4. By virtue of the afore-mentioned Rule 105, all Members of Branch Societies are entitled to apply for election to the Society without the formality of nomination. They should apply in writing to the Secretary, stating their names and addresses, and mentioning the Branch Society to which they belong. Election is by the Society upon the recommendation of the Council.

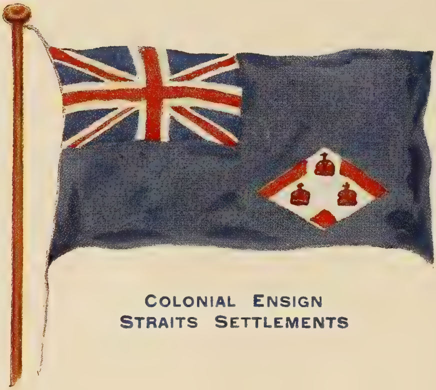
5. The subscription for Non-Resident Members of the Society is 30/- per annum. They receive the quarterly journal post free.

Asiatic Society of Bengal. Members of the Straits Branch of the Royal Asiatic Society, by a letter received in 1903, are accorded the privilege of admission to the monthly meetings of the Asiatic Society of Bengal, which are held usually at the Society's house, 1 Park Street, Calcutta.

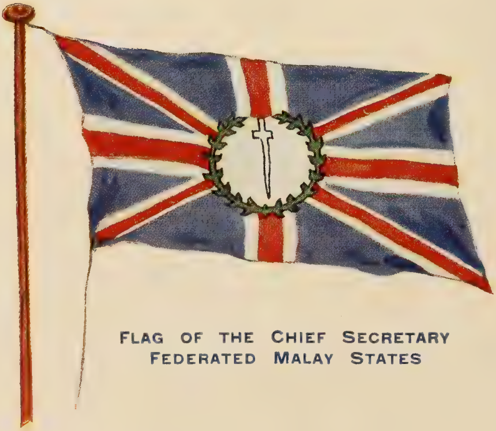
JOURNAL



Flag of the Governor of the Straits Settlements



Colonial Ensign Straits Settlements



Flag of the Chief Secretary Federated Malay States

The Flags of the Malay Peninsula.

In response to a request made some little time ago, the Council of the Society has decided to publish here seven plates illustrative of the flags generally recognised in the Malay Peninsula. The drawings from which the plates have been prepared were in most cases procured through members of the Society, who are at the same time Officers of the State serving in different parts of the Peninsula. For the ready way in which they gave their help, the Society's best thanks are due.

The ensign of the Straits Settlements is constructed as those of all British Colonies from the Blue Ensign, by the addition of the Colonial emblem in the fly. The same Colonial emblem wreathed in oak leaves in the centre of the Union Jack makes the Governor's flag. The device of the emblem is three crowns embayed on white in a lozenge the ground of which is red, the crowns representing the three Settlements.

The Chief Secretary of the Federated Malay States has a Jack corresponding to the Governor's in which a kris is the emblem.

Very recently all the Malay States used flags as emblems which were of one colour; but as it became known in them that the self-coloured flags at sea and elsewhere had special significances for the purpose of signalling, the desirability of using something more distinctive was realised and a change has been made in every State except Tringganu. Tringganu still retains its plain white flag.

Pahang, its neighbour, used a plain black flag, until, as symbolical of the Union of the ruler with his people, white was associated with the black,—first a narrow white band along the inner edge then an upper white half. This final design was fixed by the State Council on the 28th of December, 1903. As far as can be ascertained the flag of Kelantan was plain white up to the time when the State came under British Protection. Being white, it would not be distinctive as regards Tringganu. After the State had come under protection, a figure of a tiger was added in mid-flag coloured in the case of the State flag a very dark blue, and in His Highness the Sultan's own flag yellow, the ground remaining white as before. Similarly the Perak flags used to be self-coloured, but now the three colours, formerly employed, are combined into the one flag, In Kedah up to six years ago self-coloured flags were used. The Sultan used a plain yellow one, the Malay emblem of Royalty, the State flag was a plain red one and the late Raja Muda's a plain black. When the Sultan and his suite went to Europe for the corronation of their Majesties King George V. and Queen Mary, the

Malays were chagrined to find that none of their old flags could be flown as they were the nautical symbols for quarantine, gunpowder and piracy, and then the device called by the Malays the "Kedah Crown" as superimposed on the old grounds of the Sultan's, and the State's flags; and the President of the State Council was given a green flag instead of the old black one.

The crescent of Muhammedanism appears in the Kedah flag; and the crescent and star in those of Selangor and Johore. The Selangor State flag is yellow and red in quarters with a yellow crescent and star in canton. It was devised in the reign of Sultan Abdul Samad: and the yellow and red quarterings are symbolic of flesh and blood; for, as the body is of flesh and blood so is the State a combination of necessary parts.

The Johore flag is white with the crescent and star red in canton on blue.

The Negri Sembilan flag is yellow with red and black diagonal in canton: red for the Government, yellow for the Raja, and black for the Undang or States' rulers. "Negri Sembilan" means "Nine States."

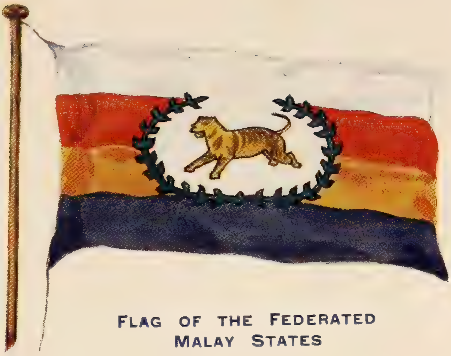
The device of the Kelantan flag reads:—

كراجأن كلنتن

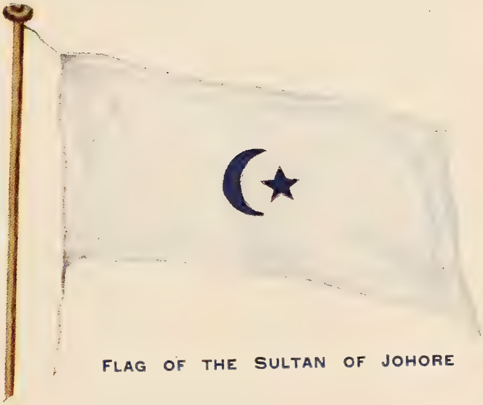
نَصْرٌ مِنَ اللهِ وَفَتْحٌ قَرِيبْ وَبَشِّرِ الْمُؤْمِنِينْ

KERAJA'AN KELANTAN.

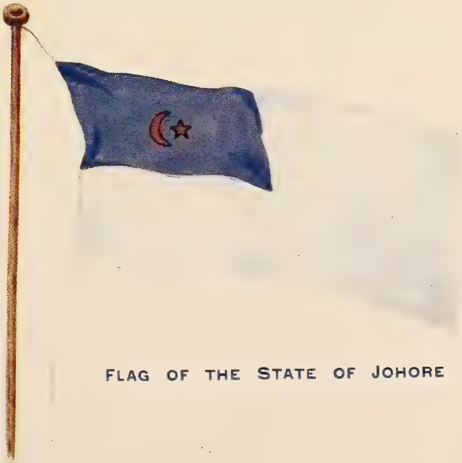
Nasrom minallah-hi wafat-hung karibun wabasshirel mo'minin.



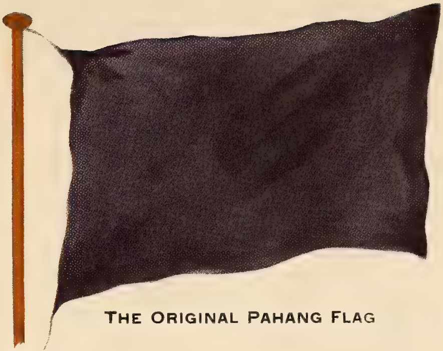
FLAG OF THE FEDERATED MALAY STATES



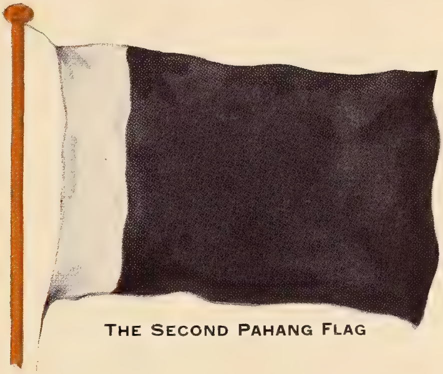
FLAG OF THE SULTAN OF JOHORE



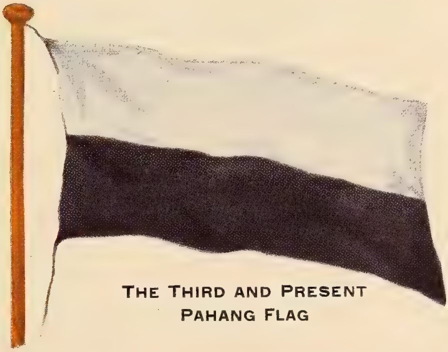
FLAG OF THE STATE OF JOHORE



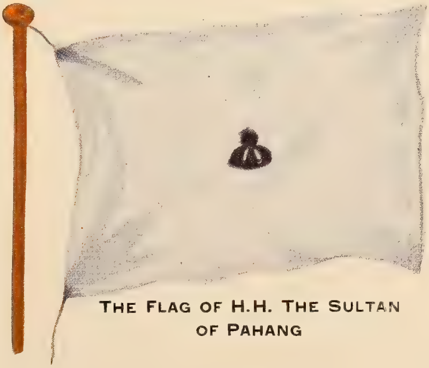
THE ORIGINAL PAHANG FLAG



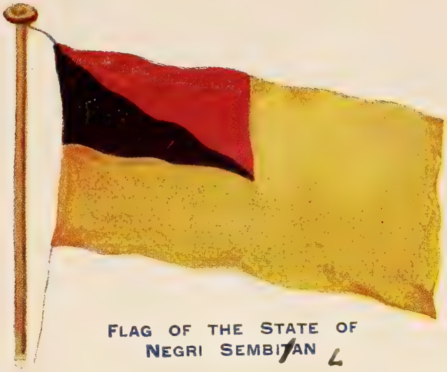
THE SECOND PAHANG FLAG



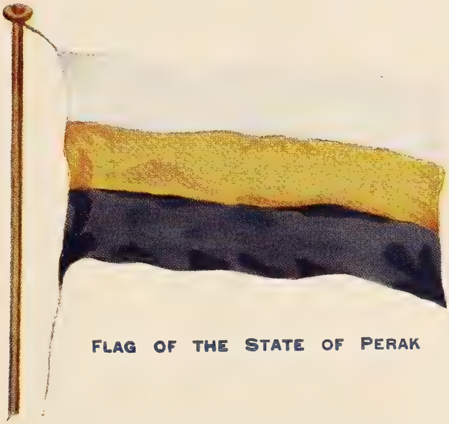
THE THIRD AND PRESENT PAHANG FLAG



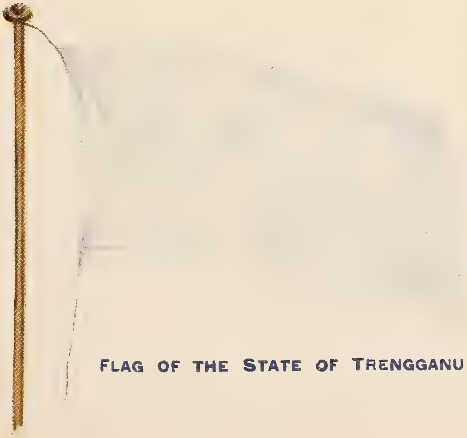
THE FLAG OF H.H. THE SULTAN OF PAHANG



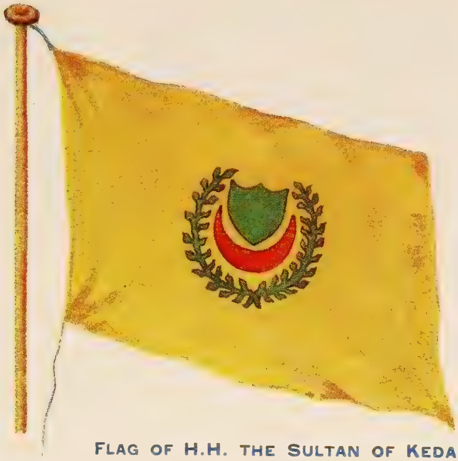
FLAG OF THE STATE OF
NEGRI SEMBI~~T~~AN L



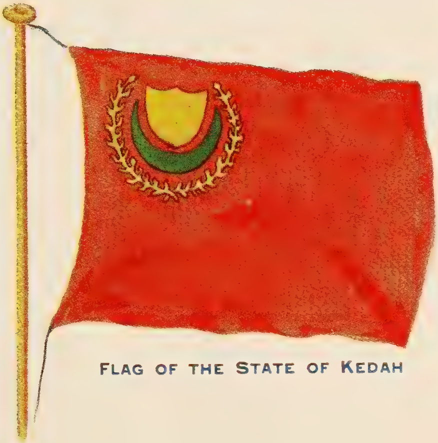
FLAG OF THE STATE OF PERAK



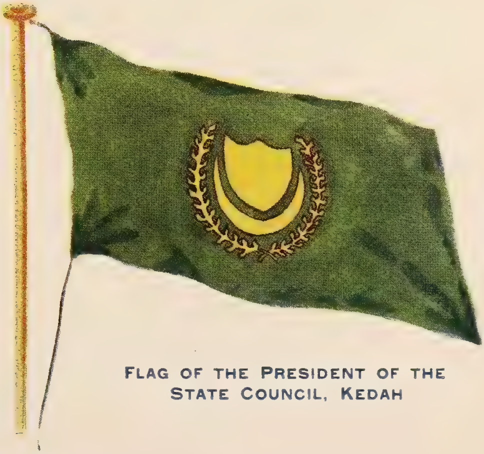
FLAG OF THE STATE OF TRENGGANU



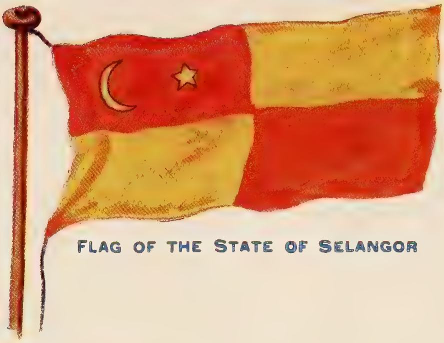
FLAG OF H.H. THE SULTAN OF KEDAH



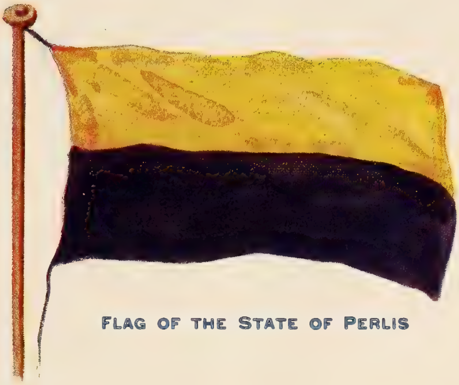
FLAG OF THE STATE OF KEDAH



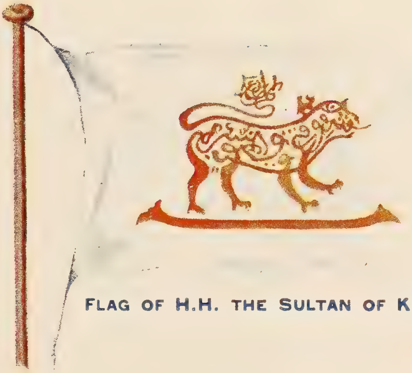
FLAG OF THE PRESIDENT OF THE STATE COUNCIL, KEDAH



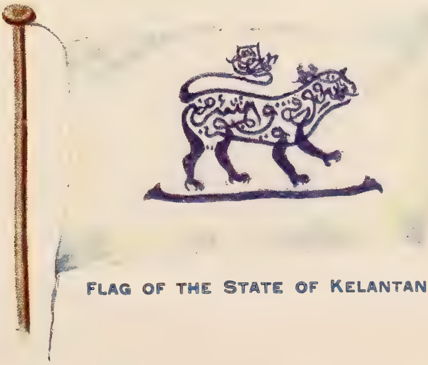
Flag of the State of Selangor



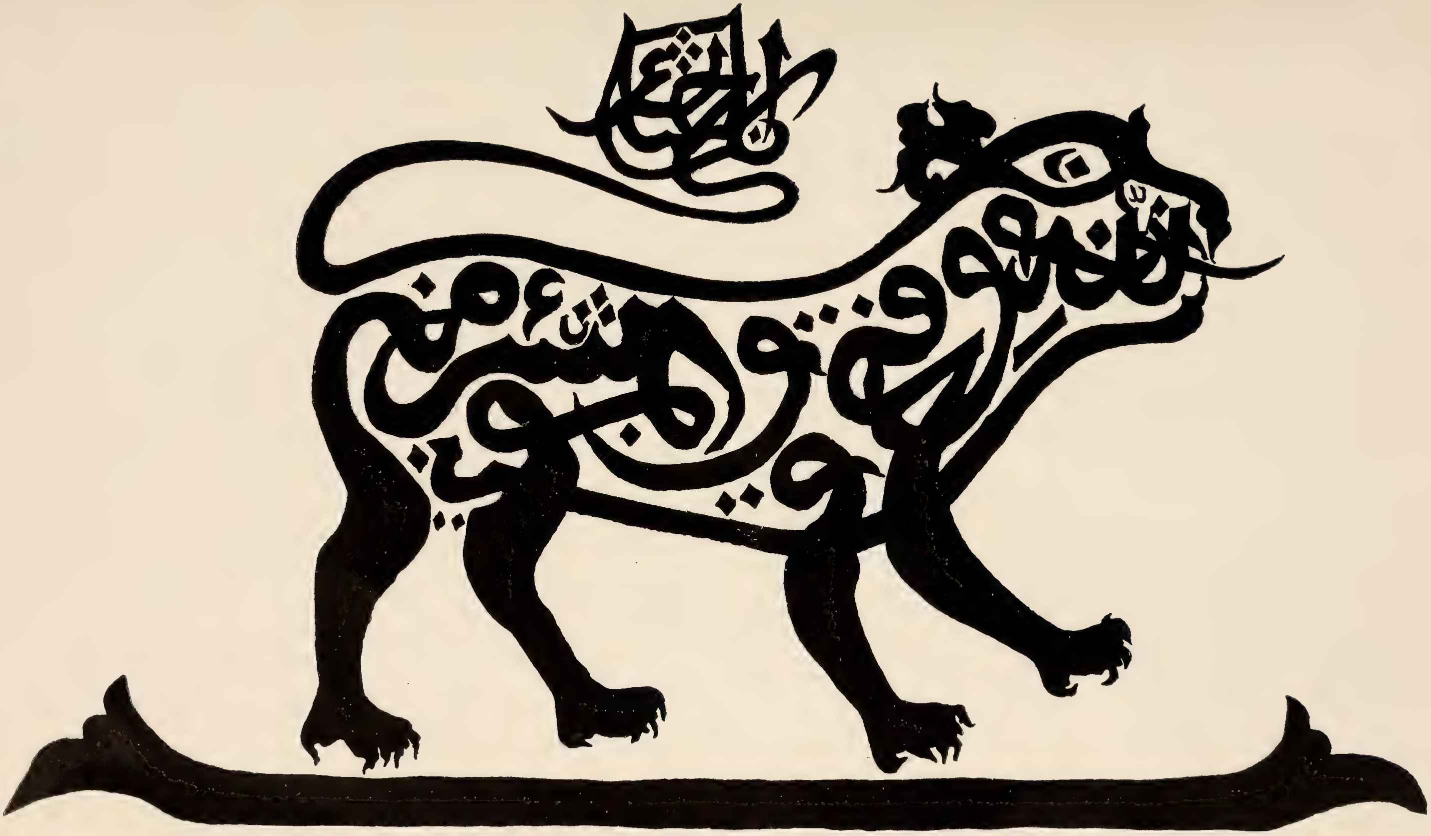
Flag of the State of Perlis



Flag of H.H. the Sultan of Kelantan



Flag of the State of Kelantan



THE TIGER OF THE KELANTAN FLAG

New and Rare Malayan Plants.

Series IX.

By H. N. Ridley, F.R.S.

In continuing my work on the Flora of the Malay Peninsula, I find a number of plants in the earlier collections which have been overlooked and not described, as well as several genera in which the species, chiefly described from more or less inadequate dried specimens, seem to have been much confused; such genera are *Glycosmis*, *Ventilago* and *Allophyllus.* In critical genera like these a really big series of specimens is required and this we seldom possess in any tropical genus. Some also differ more in habit than in what may be called herbarium characters. In the field one could not mistake the one for the other; but specimens without adequate notes as to height, and form of growth may look so far similar that a botanist who has not seen the plants alive may easily be led into thinking that they are all mere forms of one somewhat variable species. We really want more collecting and observation done. I have been surprised to note how very badly many of our commonest plants are represented in herbaria. The collections of an amateur who, just commencing the study of botany collects every weed he can find, are often extremely valuable, as the plants he gathers are just the plants that others neglect.

ANONACEAE.

Unona. Safford in Bull. Torrey Club, xxxix. p. 502, shows that the original species of this genus was an American plant to which were later added among others the species known as *Unona* in the East Indies: and eventually the original *Unona discreta,* Linn. fil., was actually excluded from the genus. This plant proves to be a Xylopia. The East Indian plants are quite distinct from it so that the generic name *Unona* disappears as a synonym of *Xylopia.* The earliest name for the East Indian " Unona " is *Desmos* of Loureiro and the following are the names of the Malay species of Unona now referred to that genus.

Desmos cochinchinensis, Lour. Fl. Cochinch. I. 352. *Unona desmos,* Dunal.

Desmos chinensis, Lour. l.c. p. 352. *Unona discolor,* Vahl.

Desmos Dunalii, Safford l.c. p. 506. *Unona Dunalii,* Wall. Cat.

Desmos dumosa, Safford l.c. p. 506. *Unona dumosa,* Roxb.

Desmos dasymaschala, Safford l.c. 507. *Unona dasymaschala,* Bl.

Desmos filipes, Ridl. *Unona filipes,* Ridl.

The genus when confined to the shrubs with large rather thin flowers with two series of unequal petals and moniliform fruiting carpels forms a well-defined genus: but to it has ununfortunately been added a section *Stenopetalae* including *Desmos Wrayi, D. desmantha, D. crinita, D. stenopetala* all Unonas of Hook. fil. & King, and kept in *Desmos* by Safford. These are small trees about 20 feet tall with the flowers and fruit exactly of *Polyalthia* and closely allied to *P. Beccarii.* The ovaries in the species referred to *Unona* (*Desmos*) contain from 2 to 5 ovules. The distinction given to *Polyalthia* from *Unona* is that it has but one or two ovules. None of the species of this supposed section of *Unona* have moniliform fruit, but 3 seeds are often developed.

I propose to remove all of them to their correct genus *Polyalthia* and transfer them to their real affinity with *P. Beccarii,* under the names of **Polyalthia Wrayi, P. desmantha, P. crinita** and **P. stenopetala.**

Unona pycnantha, Hook. fil. only known from Maingay's specimen looks to me to be a young specimen of one of these species probably *P. desmantha,* in which the flowers are not fully developed.

Polyalthia cauliflora, Hook. fil. and Thoms., Fl. Ind. 138; Hook. fil., Fl. Brit. Ind. I. 60, was based on Wallich's *Uvaria cauliflora* (Wall. Cat. 6476) a plant collected in Singapore. King omitted it altogether from the "Materials for a flora of the Malay peninsula" but quoted the description in the Annals of the Botanic Gardens of Calcutta (*Anonaceae*) and said it was indeterminable. I have examined the type in Wallich's herbarium and find it to be identical with *Polyalthia Teysmanni,* Boerl., Ic. Bogor. I 107; *Guatteria Teysmanni,* Miq. Fl. Ind. Bat. Suppl. 378.

This species is very common in Singapore and much resembles *P. Beccarii.* It is a small tree with a stem 3 inches through with transversely wrinkled bark. The flowers are orange yellow, and not cinnamon brown as in *P. Beccarii;* the fruit is larger and sometimes at least pubescent.

It occurs in SINGAPORE, at Chan Chu Kang (6231 of my collection), Toas river and Changi (5980); also on Gunong Panti in JOHORE; at Sepang in SELANGOR; and on the Tahan river in PAHANG, usually in rather sandy open woods.

Unona latifolia, Hook. fil., Fl. Brit. Ind. I. 60.

Unona Brandisana, Pierre, Fl. Forest Cochinch. p. 19 is referred by Safford to the genus *Canangium,* as *Canangium Brandesanum,* Safford (l.c. p. 504).

It is certainly closely allied to *Canangium Scortechinii* having the long conic anther appendage and elongated style of that species. The style of *Canangium odoratum* is however quite different.

It is regrettable that Safford published the name as *Canagium Brandesanum* as Pierre intended to associate the plant with Sir Dietrich *Brandis* and called it *Brandisana.* It should have been in correct Latin *Brandisianum.*

Canangium monospermum (Cananga monosperma, Hook. fil.). "A tree about 5 feet high: stem about the size of a man's thumb found on the top of Gov. Hill." "Large tree with a thick stem found about half way going up Government Hill" in Maingay's collections. This has been treated by Hooker and King as a doubtful plant; and the fruit with the specimens perhaps does not belong. It is no *Canangium* and I am very doubtful as to what it is. It has not been collected since Maingay's time; neither Curtis nor Mhd. Haniff nor I myself have been able to find it. It requires searching for again.

Sphaerocoryne, Scheff. ms. in Boerlage, Ic. Bogor. LXIX.

The species on which Scheffer apparently intended to base this genus, *S. siamensis,* was put by Boerlage into the genus *Polyalthia* as *P. siamensis,* when he described Scheffer's species. It had however been already described by Pierre, Fl. Forest. Cochinch., as *Unona Mesnyi* (Pl. 17). Pierre seemed doubtful as to where to place the plant, as in Herb. Kew he writes notes on it referring it also to *Popowia*: and Craib (Kew Bulletin, 1914, p. 5) makes a new combination of this as *Popowia Mesnyi. Popowia edulis,* Pierre, seems to me the same thing. Two other species closely allied to this species are *Polyalthia affinis,* Teijsm. and Binn., in Tijdschr. Nederl. Ind. xxvii (1864) 37; Boerlage, Ic. Bogoriensis, t. LXIII, of unknown origin cultivated at Buitenzorg and *Polyalthia aberrans,* Maingay in Hook. fil. Fl. Brit. Ind. i. 67 of Malacca and Perak.

It does not seem possible to refer these three plants to any of the genera suggested, and I therefore propose to keep up the proposed genus of Scheffer's *Sphaerocoryne* which I define below. The affinities of these plants are obscure, but they are certainly allied to Scheffer's *Rauwenhoffia* from which *Sphaerocoryne* differs mainly in its small stigmas, cylindric style and single or 2 ovules. *Rauwenhoffia* has very large stigmas, a very short style and many ovules.

Sphaerocoryne, Scheff. ms. genus ined.

Shrubs erect or scandent or small trees. Leaves coriaceous. Flowers axillary, solitary. Sepals small, ovate, valvate. Petals outer ovate, inner ones much smaller, flat not excavate at the base. Stamens oblong, numerous, connective flat, truncate. Torus globose. Pistils projecting beyond the stamens. Ovary hairy. Style cylindric, glabrous. Stigma small bilobed. Ovules 1 basal or 2, lateral. Carpels subglobose on long stalks. Seed 1 oblong.

Species 3.

S. aberrans, Ridl. *Polyalthia aberrans,* Maingay ex Hook. fil., Fl. Brit. Ind. i. 67; King, in Journ. As. Soc. Beng. lxi. pt, 2, p. 63; and in Ann. Calc. Bot. Gard. IV., 78. pl. 109a.

PERAK.

S. siamensis, Scheff. *Polyalthia siamensis,* Boerl., Ic. Bogor. LXIX. *Unona Mesnyi,* Pierre, Fl. Forest. Cochinch., t. 17. *Popowia Mesnyi,* Craib, in Kew Bull. 1914, p. 5. *Popowia edulis,* Pierre.

SIAM, CAMBODIA.

S. affinis, Ridl. *Polyalthia affinis,* Teijsm. and Binn. ex Boerlage, Ic. Bogor. t. LXIII.

Cult. in Hort. Bogor. origin unknown.

TILIACEAE.

Elaeocarpus acmosepalus, Stapf. ms.

A tree with young parts silky pubescent. Leaves thinly coriaceous drying brown, glabrous, elliptic acute or acuminate, base cuneate, margins entire, slightly thickened, nerves 3 pairs inarching within the margin, elevate beneath, reticulations wide not conspicuous, 7 cm. long, 4 cm. wide; petiole slender, geniculate .75 in. long. Racemes slender in upper axils, 6—7 cm. long, puberulous. Pedicels 6—7 mm. long. Sepals 5, lanceolate acuminate, sparsely hairy or glabrous, 6 mm. long. Petals cuneate, fimbriate, edges ciliate, nearly as long. Stamens 20—25, filaments glabrous, as long as the anthers which are awned, the awn nearly as long as the anther and tipped with hairs. Torus of 5 rounded tomentose glands grooved on the back. Ovary ovoid conic silky pilose, 3-celled, 2 ovules in each cell. Style glabrous above, pilose at base.

JOHORE. Pengerang (*N. Cantley*). Also in SARAWAK (*Beccari* 3433), and Bau (*Haviland* 2035).

Allied to *E. parvifolius,* Wall., and *E. robustus,* Roxb., which latter it resembles in having some of the leaves shewing signs of pustulations, but the leaves are quite entire and dry dark brown above and red brown beneath. The sepals are very narrow and when dry at least are curiously hooked at the long acuminate tip. Haviland's plant is more pubescent and the leaves show slight signs of crenation.

Dr. Stapf recognized this species as distinct in the Kew Herbarium but never published his description of it.

GERANIACEAE.

Connaropsis glabra, n. sp.

Tree? branches with pale bark, glabrous. Leaves simple, thinly coriaceous, oblong acuminate acute, base rounded, nerves 5—6 pairs ascending inarching within the margins, reticulations conspicuous beneath, not glaucescent, 4 in. long, 1.6 in. wide, petiole .5 in. long, petiolule .2 in. Panicles axillary and terminal, erect, 3.5 in.—4.5 in. long, lax; branches short .2—.3 in. long; pedicels .01 long. Sepals ovate acute, glabrous. Petals oblong, narrower at the base, obtuse. Stamens 10 in 2 whorls of unequal length; ovary glabrous, ovoid, obscurely angled.

PERAK. On Hermitage Hill at 1000 feet, alt., flowering in December, (*Curtis* 1345).

This species has thinner and longer leaves, (not glaucous on the backs,) than *C. monophylla,* Planch. The panicle is laxer and the whole plant glabrous.

Connaropsis laxa, n. sp.

Tree 40 to 50 feet tall, the bark of the branches pale. Leaves simple, coriaceous, lanceolate acuminate, shining, the base rounded; nerves 6 pairs slender, inarching within the margin, elevated beneath, reticulations fine conspicuous beneath, 3—4.5 in. long, 1.4—2 in. wide, petiole .5 in. long, petiolule .2 in. long. Panicles terminal and axillary, slender, lax, puberulous 2.5 to 6 in. long; branches distant 2—3 in. long with the branchlets crowded at the tip. Sepals connate at base, 5, oblong, obtuse, glabrous. Petals 5, cuneate truncate, cherry red. Stamens 10, 5 short alternating with 5 long. Ovary oblong ovate. Styles 5, short. Fruit globose, 2-celled, dark red. Seed 1.

PERAK. Taiping Hills, within 300 feet of Sea level (*Kunstler* 2384); Tea Gardens (*Curtis* 2896).

The appearance of this plant suggests a *Dapania* but it appears to be a tree and to have indehiscent fruits.

Impatiens polycycla, Hook. fil. ms.

A branched herb with nearly glabrous stem. Leaves in whorls of 2 to 5, lanceolate acuminate, narrowed to the base, serrate spinulose, with scattered long hairs on the upper surface, glaucous beneath and glabrous, nerves hardly visible 1 to 1.5 in. long, .4 in. wide; petiole .2 in. long. Stipules filiform. Peduncle 1.5 to 2 in. long. Flower patent 1 in. across, rose pink. Sepals .2 in. long, ovate caudate, glabrous, spurred one ovate lanceolate, flat, spur long and slender, 1.5 in. long. Capsule ovoid dilate in middle .5 in. long. Seed obovoid, compressed hairy .1 in. long.

PERAK. Temengoh on a sand bank in the river (*Ridley* 14591). I could find but a single plant anywhere.

Allied to *T. Griffithii*, Hook. fil. but a more branched stouter plant, with broader leaves, hairy above with the nerves almost invisible, in whorls of 5, the lower ones in pairs. The spur is also much longer and more slender.

Impatiens exilipes, Hook. fil. ms.

A branched glabrous herb about 2 feet tall. Leaves opposite or in whorls of 3, broadly lanceolate acuminate, narrowed to the base, serrate spinulose, quite glabrous, beneath glaucous, nerves 6 pairs conspicuous, 3 to 4.5 in. long. .7 to 1 in. wide; petiole .5 in. long. Pedicels 2 to 3 in. long. Flowers rose pink, centre darker. Sepals ovate oblong, cuspidate, spurred one boat-shaped, mucronate, .4 in. long, spur slender 1.3 in. long. Standard obovate, cuneate, truncate with a short point and a short rounded keel, wings broad bifid, basal lobe oblong retuse, upper one obovate retuse. Capsule short .6 in. long, broadly fusiform, beaked. Seed obovoid, flattened, glabrous.

PERAK. On the road between Tapah and Jor, abundant at one spot (*Ridley*).

I got this pretty balsam in the return from the expedition to Telom. Like the last species Sir Joseph Hooker examined it and made notes on it shortly before his death and gave it the above manuscript name. It belongs to the same section as the last but is distinct in being quite glabrous like *I. Curtisii* of the Taiping Hills but has lanceolate not ovate leaves. *I. Wrayi,* Hook. fil. from the same district has hairy leaves, an orbicular standard not narrowed at the base and a central raised line with an erect tooth in the centre, the wings are very unequally lobed and the seed is hairy. *I. sarcantha,* Hook. fil. from the Telom river has broad hairy leaves and an obovate standard, emarginate with a strong central keel running the whole length, and oblong truncate unequal lobes to the wings. The seeds are glabrous.

RUTACEAE.

Glycosmis. The various species of this genus of shrubs or small trees occurring in the Malay Peninsula have been reduced first by Oliver, Journ. Linn. Soc. V. Suppl. ii. 37, and later by Hooker in the Flora of British India and King in the Materials who have followed Oliver's classification, into three species only *G. pentaphylla*, Correa, the *Limonia pentaphylla* of Retz. and Roxburgh, *G. sapindoides*, Lindl. and *G. puberula*, Lindl., the greater number of the Indian and Malayan species being reduced to forms of *G. pentaphylla* " a very variable and most perplexing species."

The typical *G. pentaphylla* is based upon what appears to me a very distinct species which is confined to India, and does not occur at all in our area. After examining the various plants included under the names of this and the other two species, I have come to the conclusion that the various forms, perhaps a little difficult to make out from poor berbarium specimens can be quite well distinguished into species, and are not really so variable as would at first sight appear.

G. citrifolia, Lindl. Hort. Soc. Trans. VI. 72. *Limonia parviflora*, Bot. Mag. t. 2416. ?*G. simplicifolia*, Spreng. Syst. Veg. IV. 2, p. 162; Miq. Fl. Ind. Bat. I. ii. 521.

A short stiff shrub about 5 feet tall, with thinly coriaceous 1- to 3- foliolate leaves, elliptic lanceolate or oblanceolate, narrowed to the base, shortly blunt apiculate; nerves very fine, nervules nearly as conspicuous, usually distinctly gland-dotted, 4—5 in. to 6 in. long and 1.5 in. wide; petiole 1—2.5 in. long, petiolule .1 in. long. The panicles are axillary and terminal, erect and spike-like about .5 to 2 in. long, the peduncle .1—.75 in. long, but occasionally much longer. The flowers fairly numerous, are sessile or nearly so, .1 in. long. Sepals ovate acute, stiff; petals about twice as long, oblong obtuse. Stamens with linear-subulate filaments and very small anthers elliptic or elliptic lanceolate. Ovary 3—4-lobed, flask-shaped on a small disc, papillose, glabrous. Fruit as big as a pea, pale pink, translucent.

This plant does not appear to be very common in the Malay Peninsula, but I have it from Tanglin in SINGAPORE from the heaths in SETUL, and Kampongs at Kota Bahru, KELANTAN.

It is abundant in HONGKONG, and JAVA, Bandong (*Forbes* 1215): and also occurs in DUTCH BORNEO, Banjermasin (*Motley* 271), BRITISH NORTH BORNEO (*Fraser*): PHILIPPINES (*Cuming* 1200; *Loher* 215), Manila (*Merrill* 112778).

The form with unifoliolate leaves, has usually stiffer and larger leaves and is probably the *G. lanceolata*, Spreng. It occurs also in French Guyana (*Glycosmis americana*, Sagot) and Jamaica. " According to Dr. Broughton it was introduced into Jamaica from England under the name of Mandarin orange in 1788 by Hinton East, Esq." (note in Herb. Kew). These American forms, undoubtedly both introduced, resemble the Hongkong plant in having a tomentose inflorescence. The Malayan form is quite glabrous.

G. macrocarpa, Wight, Ill. i. 109.

A tree or shrub quite glabrous. Leaves 1- to 5-foliolate on the same plant, subcoriaceous, the trifoliolate leaflets are lanceolate, distant acuminate, shortly narrowed to the base, 3 in. long, .7 in. wide, petiolule .1 in.; the unifoliolate leaflets elliptic lanceolate, acuminate, base shortly narrowed, 7.5 in. long, 2.7 in. wide, very finely gland-dotted, nerves often distinctly elevate beneath in the larger leaflets, 8 pairs. The flowers white are .2 in. long 2 to 3 on very stout axillary racemes in the only Malay specimen I have seen, in terminal clusters .5 in. long in the Indian type, rachis and calyx scurfy. Sepals short ovate. Petals quite 3 times as long, linear oblong, subacute. Stamens with broad truncate linear filaments and short oblong anthers. Ovary glabrous, cylindric on a moderately large disc. Berry .75 in. long, globose with 2 large planoconvex seeds.

Perak. At 4500 feet, "a tree, flowers white" (*Wray* 264). South India: Courtallum (*Wight*).

A very distinct plant in its large flowers and very large fruit as big as a cherry. Wight gives it as shrubby, Wray as a tree.

G. malayana, n. sp.

A glabrous shrub, about 6 feet tall, with light green leaves. Buds red tomentose. Leaves 5-foliolate, thin, submembranous, leaflets elliptic, bluntly acuminate, shortly narrowed at the base, nerves 5 pairs impressed above conspicuously elevate beneath, inarching .3 in. within the margin, very finely gland-dotted above, sometimes but not always beneath, 3.5—5.5 in. long, 1—2 in. wide, petiole .5—1 in. long, petiolules .1—2 in. long. Panicles axillary and terminal 2—3 in. long, branches spreading 1 in. long, glabrous, rarely red scurfy. Buds globose. Sepals orbicular ciliate on the edges. Filaments broad, flat. Ovary cylindro-conic, 5-celled, glabrous. Fruit white, globose, narrowed at the base, .2 in. through.

Singapore. Chan Chu Kang (*Ridley* 3912). Johore. Bukit Murdom (*Kelsall*), and Sedenah (*Ridley* 13508). Selangor. Kuala Lumpur. Perak. Larut (King's Collector 2035, 2839). Penang. (*Wallich* 6373D); Muka Head (*Curtis* 722); Government Hill (*Maingay*).

This is our commonest species. The very smooth leaves with strong elevate nerves beneath and very inconspicuous nervules and reticulation beneath are very characteristic points. Frequently they are not at all gland-dotted but in the more northern Perak and Penang specimens conspicuously so.

Kunstler's specimen No. 2035 described as a tree 20—30 feet tall has a tomentose inflorescence. This is unusual though the buds in all specimens are red tomentose. The Penang plants have more distinct nervules and reticulations and are gland-dotted on both sides, and the branchlets are pustular, while the inflorescence is much more copiously branched and compact. In this it approaches *G. sapindoides,* Lindl. In the Kew herbarium specimens have been tentatively named *G. chlorosperma,* Spreng., the description of which is too incomplete to identify any species by, but as the type was obtained in Java where this species does not seem to occur, it is probable that that species is something else.

G. sapindoides, Lindl. in Wall. Cat. 6373; Hook. fil. Fl. Brit. Ind. I. 501, was collected by Wallich in Penang in 1822. The leaves are 5- to 7-foliolate with 11 or 12 pairs of fairly well elevated nerves and conspicuous nervules and reticulations, the branches are pustular, the inflorescence fascicled racemose axillary short and red tomentose, the ovary is rufous tomentose at the base.

The plant collected by Maingay on Government Hill, PENANG, described in his field note as 30 feet high and as thick as a man's thumb, is quite glabrous, and has a terminal inflorescence; so I refer it to *G. malayana.* No one has apparently seen *sapindoides* since Wallich's time.

G. macrophylla, Lindl. Wall. Cat. 6377, not of Miquel.

A shrub 2—3 feet tall. Leaves always simple, thinly coriaceous, elliptic, narrowed slightly at the base, acuminate, frequently not gland-dotted, pale beneath, nerves strongly elevate beneath 10 pairs inarching shortly within the margin, reticulations conspicuous, 8 in. long, 3.5 in. wide, petiole thick .2—1 in. long. Panicles terminal, or 1 axillary in the uppermost leaf axil, 2.5 in. long with very short branches .1 in. long. The flowers very small in umbels at the end of the branches. The sepals ovate not ciliate. The petals short oblong. Ovary conic cylindric, glabrous on a very large disc.

PENANG. (*Wallich* 6377; *Curtis* 89).

var. *macrorachis,* King.

An erect shrub 2 to 4 feet. Leaves lanceolate acuminate, 13 in. long, 3—7 in. wide, narrowed to the base. Panicle slender elongate, 6 in. long, quite glabrous, base 1 in. wide, floriferous part 6 in., branches distinct .1—.4 in. long with small terminal umbels of flowers at the ends. Fruit round and white.

PENANG. Waterfall and Pulau Butong (*Curtis* 89).

A very distinct plant peculiar apparently to Penang.

G. tomentella, n. sp.

Shrub. Buds red tomentose. Leaves 5-foliolate, rhachis finely tomentose, 4 in. long; leaflets elliptic ovate bluntly acuminate, base rounded, submembranous, nerves 5 pairs elevate beneath, inarching within the margin, 4 in. long, 2 in. wide, terminal one 7 in. long 2.25 in. across, petiolule tomentose .1 in. long. Panicle terminal; peduncle 1.5 in. long, floriferous portion 1.5 in. long, lower branches 1.2 in. long, patent, rhachis scurfy, flowers .1 in. long, sessile in small clusters on the branches. Sepals ovate obtuse. Petals oblong obtuse. Stamens; filaments linear, flat, oblong, anther elliptic. Ovary conoid on a rather large cushion-like disc, glabrous.

SELANGOR. Menuang Gasing, Langat (*Kloss*).

A very distinct plant in its ovate leaflets with rounded bases, and finely scurfy tomentose rhachis, petiolules and inflorescence: a little scurf occurs too on the midrib and back of the leaves generally.

G. crassifolia, n. sp.

Branches stout, woody. Leaves simple, very coriaceous, oblong, elliptic lanceolate, narrowed to the base, bluntly acuminate, gland-dotted above, less conspicuously beneath, nerves fine not elevate inconspicuous, 10 pairs, nervules nearly as conspicuous, reticulations very inconspicuous, 8 in. long, 2.1 in. wide, petiole thick .5 in. Flowers small sessile in very short axillary clusters .1 in. long, very few in the cluster, rhachis and ovate sepals red tomentose. Petals broadly lanceolate blunt, glabrous. Stamens short "connective of anthers with a glandular blunt apiculus." Ovary conoid cylindric, glabrous. "Fruit fleshy."

MALACCA. (*Maingay* 3374).

A very curious plant of which I have only seen a single specimen of Maingay's with one open flower. The coriaceous simple leaves and small flowers in very small axillary clusters distinguish it readily from any other species. Hooker referred it to the var. *longifolia,* Oliv. of *G. pentaphylla,* an Assam plant which I think is distinct though allied.

G. monticola, n. sp.

Shrub glabrous. Leaves 5 in. long, leaflets 5, coriaceous, dotted above, narrow lanceolate, acuminate cuspidate tip blunt, base long, narrowed, cuneate, nerves 6 pairs faint, 3 to 4 in. long, .5 to 1 in. wide, petiolules .1 in. long. Panicle terminal 1 in. long, branches .2 in. long, few flowered. Sepals rounded. Petals ovate. Stamens: filaments very short, anthers apiculate. Pistil cylindric.

MALACCA. Mt. Ophir (*Ridley* 3285).

Distinct in its very narrow elongate, coriaceous leaves, gland-dotted above, finely reticulate beneath ending in a long blunt tipped point and much narrowed to the base.

G. puberula, Lindl. Wall. Cat. 6375; Oliv. l.c. 39; Hook. fil. Fl. Brit. Ind. I. 501.

A small leaved shrub with usually trifoliolate leaves and red tomentose inflorescence and ovary. Fruit as big as a pea, globose, glandular.

PENANG. (*Wallich* 6375 A and B); Government Hill at 500 feet (*Curtis* 88). PERAK. (*Scortechini*). A variety with stiff coriaceous leaves with a broad blunt point, nerves invisible above.

Wallich 6375B is labelled Singap(ore) but it may be doubted if it too did not come from Penang, as it has never again been found so far south.

G. rupestris, Ridl. is allied to *G. puberula,* but its ovary is always glabrous, as is the whole inflorescence.

KEDAH. On Gunong Geriang, Pulau Adang, Rawei Island; PERLIS, on Bukit Lagi, (*Ridley* 15752).

var. *tomentosa,* n. var. has the inflorescence red hairy though the ovary is glabrous, but glandular.

KEDAH. Lankawi, Pulau Segai (*Ridley* 15566). Pulau Adang (*Ridley* 15844 and 15843) both larger leaved than type. SOUTHERN SIAM. Koh Samui (*Robinson*).

A plant very closely allied to *G. rupestris,* if not identical specifically, was collected at Montalban in the Philippines in the Province of Rizal (*Loher* 6767 and 6774) but the leaves are all unifoliolate.

BURSERACEAE.

Santiria laxa, King. *Canarium laxum,* Benn.

The female flowers of this tree have not been described. They are distinctly larger than the male flowers, the blunt oblong petals being .3 in. long and are borne on longer slender pedicels, .5 in. or more in length. The stamens (abortive) are as long as the pistil, the anther thick linear and blunt, longer a little than the filament. The ovary is thick oblong and somewhat distinctly 3-lobed. The stigma sessile, large three-lobed, thick and overlapping the ovary.

Icicaster Planchoni, n. gen.

I found the genus Icicaster for the plant formerly known as *Santiria Planchoni,* Benn. Fl. Brit. Ind. I. 536 and Engler, Mon. Phan. IV. 154. *Canarium Planchoni,* King, Mat. Mal. Pen. p. 482.

Planchon named it *Icicopsis* in Herb. Hook., but this generic name was never published and Engler unfortunately used it for certain American plants now reduced to *Icica.* In the Pflanzenfamilien it is put as a section of *Santiria* under the name *Icicopsis,* and *Trigonochlamys* is also put as a section of *Santiria.*

The plant in fruit resembles *Trigonochlamys Griffithii* except for the small calyx lobes but the flowers are small and resemble those of a *Santiria* except that they have but three stamens.

The characters of the genus *Icicaster* may thus be given. A tree with pinnate leaves of 7 to 13 leaflets, unisexual. Panicles axillary, shorter than the leaves. Flowers small crowded near the tips of the branches. Calyx campanulate deeply cleft into 3 ovate triangular lobes, small. Petals 3, slightly larger, deltoid. Stamens three, anthers ovate, filaments shorter, flat, inserted on the edge of a large cupular fleshy disc. Ovary in the female flowers small, ovate, three-lobed. Style terminal, short. Stigma 3-lobed. Drupe ovoid globular, slightly gibbous, style persistent, slightly lateral.

It appears to be not rare in the south of the Peninsula in SINGAPORE, MALACCA and PERAK as far north as Taiping. The fruit is yellow and bead-like.

MELIACEAE.

Amoora malaccensis, n. sp.

Tree, bark of branches wrinkled, young branches red pubescent (when dry). Leaves 9—12 in. long, imparipinnate, rhachis scurfy puberulous; leaflets 11—13, opposite, elliptic or elliptic-lanceolate, acuminate, base cuneate or rounded, slightly inaequilateral, coriaceous, glabrous, smooth, slightly shining above, red brown beneath when dry, nerves about 16 pairs, very fine and inconspicuous, depressed above, faint beneath, 2.1 to 4.25 in. long, .75—1.8 in. wide, petiolules .1—.2 in. long. Panicles axillary 6—8 in. long with ascending branches 1—2 in. or less long, scurfy, pubescent. Flowers male .05 in. long in threes or fours at the ends of the branchlets, sessile. Calyx lobes short, rounded base thick campanulate, pustular. Petals ovate obtuse longer incurved. Stamen-tube nearly as long as the petals, broadly oblong globose, wide open at the top, lobes rounded, short, anthers 6, not exserted. Ovary glabrous, oblong. Fruit globose, 2 in. through, densely minutely velvety tomentose. pericarp very thick, woody.

MALACCA. Ayer Panas (*Goodenough; Ridley* 1797) flowers; (*Maingay* 1455) fruit.

Nearest to *A. lanceolata*, Hiern, but the leaves are thinner, larger and less coriaceous with more distinct nerves, the flowers are smaller and glabrous, the staminal tube has rounded short lobes.

Aglaia rufibarbis, Ridl.

I find that the plant described by me in the Journ. Roy. As. Soc. Str. Branch vol. 54, p. 32, as *Aglaia rufa,* Miq. is not that species but is a distinct and previously undescribed one. I therefore give it the name of *A. rufibarbis.*

Dysoxylon pulchrum, n. sp.

A small tree, glabrous except the flowers. Leaf over a foot long, rhachis stout. Leaflets more than 11, alternate, rather distant, coriaceous, oblong, rather abruptly blunt acuminate, base cuneate or broadly rounded, equilateral or very nearly so, midrib stout, prominent beneath, nerves 11 pairs, slender but prominent beneath, 8—9 in. long, 3—3.5 in. across, petiolules .2—.3 in. long, stout. Panicles large over a foot long, branches 8—12 in. long, stout, scurfy, branchlets scattered, 1—2 in. long with short terminal cymes of 1—3 flowers. Pedicels .1 in. long. Flowers nearly .2 in. pure white, buds truncate, oblong. Calyx flat, saucer-shaped with 4 or more irregular lobes. Petals much longer, oblong obtuse, glabrous outside, puberulous inside. Stamen-tube cylindric, thick pubescent outside, villous inside, mouth nearly entire, anthers included 10. Disc cylindric, hairy, longer than ovary. Style very stout, glabrous above. Stigma large capitate.

PENANG. At the top of the hill, 1800 feet alt. (*Ridley*) in thick forest.

A beautiful plant which was a mass of white bloom when I collected it in March 1915.

The leaves closely resemble those of *D. thyrsoideum,* Griff. but the panicles and flowers are far larger, the petals broader, the stamen-tube quite hairy inside and out.

Walsura tenuifolia, n. sp.

A tree glabrous except the flowers. Leaves 5 in. long; leaflets 5, thin membranous, glaucous beneath, elliptic acuminate acute, base rounded or shortly cuneate, nerves about 8 pairs, elevate beneath, reticulations fine, conspicuous when dry, 2—4 in. long, 1—1.5 in. wide, 1.5 in. apart on the rhachis; petiolules .2 in. long. Panicles long, 12—14 in., lax with distant branches 1.5 in. long, glabrous below, scurfy above. Flowers few .2 in. long, pedicels .05 long. Calyx minutely puberulous, short;

lobes acute 5. Petals oblong obtuse puberulous outside, glabrous within. Stamens connate for half their length, pubescent on both sides, filament (free part) linear subulate, anthers small. Ovary cylindric, glabrous. Style stout, shorter than the stamens. Stigma capitate. Disc thick fleshy annular.

PERAK. Kamuning (*Ridley* 3022).

Allied to *W. neurodes,* Hiern. but with much thinner leaves, the stamens much more united, and ovary glabrous.

OLACACEAE.

Gonocaryum crassifolium, n. sp.

Shrub with flexuous branches, glabrous except the inflorescence. Leaves alternate, stiffly coriaceous, ovate acuminate or oblong acuminate, base rounded, midrib above channelled, beneath strongly elevate, almost keeled, yellow, nerves elevate beneath, 5 pairs ascending, rather slender, 7 in. long, 3.5 in. wide, petiole thick rugose .75 in. long, yellow. Spikes 3—4 together in an axil, slender, pubescent, 2—2.2 in. long. Flowers .05 in. long, scattered. Bracts small ovate. Calyx base campanulate, 5-lobed, lobes ovate obtuse, pubescent outside, imbricate. Petals twice as long hardly cohering, glabrous, ovate oblong, apex incurved, fleshy edges thickened, concave. Stamens 5, filaments much shorter than the anther, which is oblong obtuse, red. Disc small annular undulate. Pistillode small, pilose. Female flowers and fruits unknown.

SELANGOR. Sempang mines (*Ridley* 15695).

In foliage this resembles *G. pyriforme,* Scheff. but the flowers are very much smaller and the rhachis and calyx pubescent.

CELASTRACEAE.

Celastrus malayensis, n. sp. *C. Championii,* King, Mat. Mal. Pen. p. 353 (not of Bentham).

A glabrous woody climber with black stem. Leaves usually stiffly coriaceous, elliptic to ovate, acute or acuminate, serrate or nearly entire, base shortly cuneate; nerves 5 to 6 pairs, prominent beneath, 3.5 to 4.5 in. long, 1.5 to 1.7 in. wide, petiole .25—5 in. long. Racemes several from one axil 2 in. long with the flowers in small lax cymes, pedicels .01. Flowers nearly .1 in. across. Calyx very small, obscurely 5-lobed. Petals very small, oblong round-tipped. Fruit on pedicels 2 in. long, three-valved, orange colour, valves ovate .3 in. long and as wide. Seed 1.

PAHANG. Sungei Jelai (*Ridley* 11581); Telom (*Ridley*). PERAK. Gunong Batu Putih (*Wray*), Maxwell's Hill (*Ridley*). PENANG. Penang Hill (*Ridley*); Penara Bukit (*Curtis*). PATANI. Tomoh (*Machado*).

Native name "Akar Surukop."

This plant appears to me to be quite distinct from the Hongkong plant, the flowers of which are larger and in umbellate cymes on the ends of branches, not as in this case in racemes of small cymes. The petals are smaller and narrower, and the fruit smaller, the valves being as long as they are wide.

Microtropis valida, n. sp.

Branches stout. Leaves thickly coriaceous, shining, elliptic, acuminate acute, base cuneate, 3.5 to 6 in. long, 1.5 to 3 in. wide, nerves 6 to 8 pairs, slender, nervules and reticulations equally prominent on both sides, petiole thick grooved .5 in. long. Cymes stout, 3 in. long, peduncle 1.5 in. long, branches .5 in., branchlets .2 in. long. Flowers clustered in threes on the end of each branchlet, .4 in. across, sessile. Sepals 4, imbricate, rounded in two unequal pairs, glabrous, coriaceous with thinner edges, the inner pair the largest. Petals connate below, lobes 4, short, broad, rounded. Stamens 4 inserted on the tube, filaments broad. Pistillode truncate.

PERAK. Hermitage Hill (*Curtis* 1331).

Euonymus rufulus, n. sp.

Small tree with grey rather knotted branches. Leaves opposite, coriaceous, glabrous, elliptic, blunt, acuminate at both ends, base subacute, nerves about 5 pairs, invisible above, obscure beneath, midrib elevate on both sides, 1.5—4 in. long, .5—.75 in. wide; petiole .25 in. long, thick, grooved. Cymes several in an axil, slender, peduncle .4 in. long, pedicels as long, about 3. Flowers dull red, .15 in. across. Sepals orbicular 5. Petals transversely rounded, oblong, minutely denticulate punctate. Stamens 5, very short, filaments subtriangular, flat; anthers transversely oblong; style short.

PAHANG. Gunong Tahan at 5000 ft. alt. (*Robinson and Wray* 5332). Small tree, flowers dull red.

A very distinct species with more coriaceous leaves, and smaller flowers with shorter, broader petals than *E. Wrayi* which is probably its nearest ally.

Salacia rubra, Lawson in Hook. fil., Flora of British India, I. 627.

Of this dubious plant collected formerly by Maingay, who had only fruiting specimens, we have now adequate material, collected in the garden jungle in Singapore by me, (No. 10164 of my collections), so I give a complete description of it.—A climbing shrub with whitish bark. Leaves opposite, elliptic cuspidate, narrowed to the base entire, coriaceous and drying dark brown, nerves 5 to 6 pairs, faint inarching far from the margin, 3.5 in. long, 2 in. wide, petiole .2 in. long. Flowers .15 in. across in fascicles of 5 or 6, pedicels 2 in. long, slender. Calyx flat, lobes short, blunt, rugose. Petals lanceolate, obtuse, rather fleshy with a keel on the back. Stamens 3 from the top of the disc which is tall and fleshy; filaments short, linear recurved rather broad, anthers rounded, elliptic. Ovary quite immersed in the disc. The fruit about 1 in. through, rugose bright red.

S. verrucosa, Wight Ill. i. 134 (1831). This is identical with *S. polyantha,* Korthals, Flora, XXXI (1848) 379, and is the earlier name. It is a native of Mergui and Borneo and has been collected also at Tongkah, and Lankawi by Curtis.

S. ovalis, Lawson l.c. 627: *S. Lawsonii,* King in the Materials, appears to me to be nothing more than a state of the common *S. flavescens,* Kurz.

S. Lobbii, Lawson, seems to be merely a form of *S. Maingayi,* Lawson.

Salacia Korthalsiana, Miq.; *S. radula,* Hassk. Pl. Jav. p. 231 (not of Don.).

A climbing shrub with rather large alternate coriaceous leaves, oblong with a short blunt point; nerves elevate beneath the 7 pairs, 7 in. long and 2.75 in. wide. Flowers in small cymes at the ends of axillary panicles with rather thick dichotomous branches, 1.5 in. long, including the rather long peduncle. Sepals rounded, 5. Petals oblong, yellow, .1 in. long. Disc rather large and thick. Fruit ovoid blunt, .75 in.

SINGAPORE. Bukit Timah Road at 7½ miles (*Hullett* 905). Also occurs in Java.

This plant has been omitted by King from the Materials. It does not appear to be common anywhere. The branches are in Javanese specimens especially dotted over with raised lenticels hence the name *S. radula,* but Hullett's plant hardly shows them. The long stalked inflorescence is peculiar, and gives it the appearance of a *Hippocratea.*

Hippocratea nigricaulis, n. sp. *H. macrantha,* King l.c. 357, not of Korthals.

Slender climber 10 to 30 feet long, stem black, rough. Leaves coriaceous, shining, bright green, elliptic, blunt, rounded at the base, crenulate sometimes very slightly, nerves 6 pairs, elevate beneath, 2—5 in. long, 1.3 to 2.75 in. wide, petiole .01 in. long. Panicles 1 in. long, red puberulous. Flowers .3 in. across, pale yellow or greenish yellow. Calyx cupular with broad shallow teeth. Petals triangular lanceolate, minutely puberulous, outside, quite glabrous within. Disc deep fleshy, glabrous with some minute hairs on the upper part. Fruit elliptic oblong of 2 carpels 3.2 in. long, .75 in. wide, thin woody striate. Seeds 2.25 in. long.

MALACCA. In forests, (*Griffith*). SELANGOR. Rawang Camphor forest (*Ridley*). PERAK. Larut Hills (*Kunstler* 7570, 5118). PENANG. Government Hill (*Ridley*). BURMAH. ASSAM. Duffla Hills (*King's collector* 83). BENGAL. Chittagong (*Lister*).

This plant was referred by King to *H. macrantha,* Korth. Verh. Nat. Gesch. 187 t. 39 which plant is undoubtedly the same thing as *H. Cumingii,* Laws. Flor. Brit. Ind. I. p. 624. Korthal's figure and a specimen from him in Herb. Kew clearly represent the river-bank plant known as *H. Cumingii.* The black rugose stem, crenate leaves very variable in size, red pubescent inflorescence, absence of hairs on the petals and larger fruit distinguish *H. nigricaulis,* Korth. readily from the true *H. macrantha.*

H. macrantha, Korth. is not rare in the south of the Malay Peninsula, Borneo and the Philippines. There is a specimen from the Hookerian Herbarium at Kew labelled Ceylon collected by Colonel Walker. It does not seem to have been met with in Ceylon again and the specimen was perhaps from Singapore where also Colonel Walker collected. It occurs on the banks of tidal rivers and is called Akar Bintang by the Malays from its yellow star-shaped flowers.

H. ferruginea, King. An examination of the type plant of *Salacia Griffithii,* Lawson Fl. Brit. Ind. I. 628, shows that this plant collected by Griffith in Malacca is no *Salacia* at all but *Hippocratea ferruginea,* King.

RHAMNACEAE.

Ventilago. The species of this genus have been very much confused in the Flora of British India and in King's Materials for a Flora of the Malay Peninsula, and the whole genus confined to the Indo-Malayan region with outliers in China and Formosa requires revision. The type of the genus is *V. madraspatana,* Gaertn. a native of India as far as Mergui. It has not been met with apparently in Java, for the plants so identified belong to a distinct species. *V. calyculata,* Tul. has much the same distribution, but occurs also in Siam and Cochinchina. Its curious yellow fruits covered half way by the cupshaped calyx and entirely pubescent distinguish it readily.

Ventilago leiocarpa, Benth. in Journ. Linn. Soc. V. 77; Fl. Hongkongensis was described shortly from plants from Hongkong collected by Champion, some of Griffith's Malacca plants and a West African plant collected by Barter. All these separate gatherings belong to distinct species, which merely have in common the covering of the nut half way up by the calyx. It seems probable that Bentham first employed the name *leiocarpa* for the Hongkong plant and for that it had better be kept. It has nearly entire small leaves, branches quite glabrous, flowers in cymes of 3, axillary in the axils of full-sized leaves; the fruit has the nut covered for a quarter of its length only by the cupshaped calyx and its wing is slightly narrowed towards the base and acute at the tip.

V. malaccensis, n. sp. *V. leiocarpa,* Benth. in part. (Malacca specimens).

A big climber, branchlets velvety pubescent. Leaves elliptic acuminate, rather abruptly and bluntly, base shortly narrowed, edge bluntly serrate, 2.5 to 3.5 in. long, 1.25 to 2 in. wide, thinly coriaceous, drying dark brown, nerves 4—8 pairs, prominent beneath, faint and sunk above, petiole pubescent thick grooved .2 in. long. Flowers in compact axillary cymes of about 12 or more, and about .15 across on slender pubescent branches with small leaves about 1 in. long soon caducous so that the branches eventually appear as panicles often over 6 in. long. Bracts ovate acute, pubescent, pedicels .1 in. long, glabrous. Buds flattened at top, bluntly 4-angled, glabrous. Calyx campanulate, lobes 5, triangular acute, glabrous with a keel on the inner face near the tip. Petals much smaller, spathulate bilobed, lobes rounded. Stamens a little longer, filament slender, anthers small. Ovary immersed in disc, hairy. Styles 2. Nut globose, covered half way by the calyx, .2 in., wing oblong linear blunt, glabrous, not narrowed at the base, 2 in. long, .3 in. wide.

SINGAPORE. (*Cantley* 190). MALACCA. (*Maingay* 1669, 1148, 406, 408, 1670; *Griffith*). PERAK. Larut (*Kunstler* 3461, 7644), Batang Padang district (*Kunstler* 7750). PENANG. Chalet (*Curtis*). BORNEO. Rejang (*Haviland* 2863).

There is a considerable amount of variation in specimens as to size of leaves, amount of serrulation and development of panicle. Some specimens have small but well developed leaves on the slender branches which bear the flowers, but these are never as large as the stem-leaves and appear to fall off very soon. In many specimens I see no trace of these leaves, so that the whole inflorescence forms a panicle with numerous branches bearing the small scattered cymes. Occasionally the branchlets appear to be glabrous.

V. gracilis, Rolfe and Merrill, is apparently closely allied but the flowers are pubescent. I am very doubtful about *V. lucens,* Miq. of Sumatra. The description is hardly adequate and the only specimen I have seen in Herb. Kew has rather stiffy coriaceous leaves not narrowed to the petiole but with a short rounded point like a small form of *V. Maingayi.*

V. gladiata, Pierre, Fl. Forest. Cochinch. t. 314, C.

Leaves lanceolate acuminate, narrowed to the base, membranous, minutely serrulate and minutely pustulate on the back, nerves 6 pairs, slender elevate beneath, transverse nervules not seen, 2.6—3 in. long, 1—1.1 in. wide, petiole .15 all glabrous. Inflorescence axillary racemes the cymes very small and few flowered, rhachis puberulous. Flowers unknown. Fruit glabrous, pedicel .1 in. long, nut .2 in. globose enclosed in the calyx cup for ¾ its length, wing lanceolate narrowed to the base and acute at the tip, 2.5 in. long, .4 in. wide.

PERAK. Sungei Larut (*Wray* 2276).

Distrib. Cambodia.

V. oblongifolia, Bl. Bijdr. 1144; Miq. Fl. Ind. Bat. I. i. 640. *Smythea macrocarpa,* var. *pubescens,* King.

A stout liane with membranous lanceolate acuminate acute leaves, base rounded serrate, glabrous on both sides or tomentose beneath, nerves 7 to 9 pairs, strongly elevate beneath, 4 to 4.5 in. long, 1.5 to 1.75 in. wide; petiole .1 in. or less. Inflorescence axillary or terminal, rhachis rather stout, tomentose; branches 4 in. long with distant cymes of several flowers. Fruit glabrous, nut .2 in. long, ovoid: calyx not enclosing it: wing linear oblong obtuse twisted at the base 3.1 in. long, .5 in. wide.

SELANGOR. Batu Caves (*Ridley* 13349). PERAK. Waterfall hill (*Wray* 2211, *Scortechini*).

Distrib. Java and Philippines.

Smythea pacifica, Seem. Bonplandia, 1861. 255. *Sm. reticulata,* King, Mat. l.c. 381. *Berchemia trichantha,* Miq. Fl. Ind. Bat. Supp. 331.

This plant seems to be distributed over the sea shores from the South of the Peninsula, from SINGAPORE, Serangoon (*Ridley* 9151), Bajau (3592*a*), Toas (6379), JOHORE, Scudai river (12211), Tana Runto (1917) to PENANG, Pulau Jerajak (*Curtis* 2424) and also Pulau Sangian. BORNEO, TIMORLAUT, ARU, NEW GUINEA and PHILIPPINES to the FIJI ISLANDS.

AMPELIDACEAE.

Vitis pyrrodasys, n. comb. *Cissus pyrrhodasys,* Miq. Fl. Ind. Bat. Suppl. 517 is in King's Materials, put as a synonym of *V. adnata,* Wall. Cat. It seems to be abundantly distinct in its dense red tomentum covering the stem and the backs of the leaves, *V. adnata,* Wall. having only a thin rusty pubescence in place of it. I have not seen it from the Malay Peninsula.

V. glaberrima, Wall. in Roxb. Fl. Ind. (ed. Carey II. 476) is given as a synonym of *V. hastata,* Miq. by King on the ground that Wallich distributed a mixture of this and another species which he described as *V. cerasiformis,* Teysm. var. *Wallichii* and that the description agrees with *V. hastata,* Miq. Carefully reading the description however I find that it does not apply at all to the latter species but it is a good description of the plant King describes as *V. cerasiformis* var. *Wallichii.* It seems to be a very distinct species and not very common. The fruit is by no means large.

V. hastata, Miq. is a common and conspicuous plant in Singapore, and occurs in Pahang at Pekan, in Malacca, Selangor, Province Wellesley, Perak and Lankawi, also in Sumatra and Borneo. It is easily recognised by its square-winged stem, almost white and succulent, and bright red tendrils. The flowers in moderately large cymes with red tinted peduncles, have a cup-shaped entire calyx of a pale green. The petals are oblong thick and shoe-shaped, excavate, reddish outside with a darker red spot at the tip, widely expanded in flower. The filaments narrowed upwards are green, anthers short, oblong, yellowish edged red. The disc is flat, rather thick with wavy margins, orange colour. The ovary immersed in it is pale green, the style stout and shorter than the stamens with a capitate yellow stigma. The flowers have a faint scent of cowslips. The fruit small and black. The glaucous stems and red tendrils with the red tinted flowers give it quite a pleasing appearance.

Vitis (Tetrastigma) Curtisii, n. sp.

Stem smooth, black, terete. Leaves trifoliate; leaflets coriaceous, glabrous, entire, obovate cuspidate, narrowed to the base, nerves about 8 pairs, nervules and reticulations as prominent, 2.5 to 3.6 in. long, 1.3 to 1.9 in. wide, petiolules .2 in. long, median one .4. Petiole .5 in. Cymes numerous .3 in. long, graceful, spreading, compound, puberulous. Flowers .1 in. long, pedicels as long. Calyx very short, cup-shaped. Petals oblong, apex incurved fleshy, 4. Stamens shorter; filaments broad linear. Ovary globose, free. Stigma large, conic, lobed.

PENANG. Government Hill, close to Gun Hill (*Curtis* 3363).

Vitis polystachya, Wall. Cat. 6028.

King and Planchon both say "in part;" but the type is a single specimen from herb. Finlayson. *V. nitida,* Lawson from Penang is the same. *V. polythyrsa,* Miq. a much more slender plant does not occur in the Malay Peninsula at all; nor does *V. thyrsiflora,* Miq. which resembles *V. polystachya,* but is very thickly tomentose instead of being nearly glabrous beneath the leaves. All the specimens put under these two species quoted by King, which I have seen, are *V. polystachya,* Wall.

V. capillaris, n. sp.

Slender vine; stem arachnoid hairy. Leaves compound, petiole 1.75 long, base thickened and red hairy, leaflets membranous, central one elliptic lanceolate rather abruptly narrowed to a broad or acute mucronate point 2.5 in. long, 1 in. wide, petiolule short red hairy, lateral petiolules .3 in. long, blade hairy trifoliate, uppermost leaflet biggest, lanceolate acuminate, laterals oblique narrowed to base, sparsely toothed on the outer edge, nerves 3—4 pairs, slender, hairy beneath, .5—1.5 in. long, .4—.9 in. wide. Peduncle 4 in. long, slender pubescent, panicle 2.75 in. long, branches .5 in. long or less, all pubescent, lower ones branched again. Flowers distichous, .05 in. sessile. Calyx cup-shaped, obscurely 4-toothed, glabrous. Petals 4, oblong. Ovary conic, style conic, stout.

BORNEO. Sarawak (*Beccari,* 748).

Nearest to *V. polythyrsa,* Miq. but much more slender, much less hairy, leaves thinner, leaflets fewer-nerved and toothed and more oblique.

V. pterisanthella, n. sp.

A slender vine nearly completely glabrous except the inflorescence. Leaves trifoliate, membranous, petiole 1.2—2 in. long, leaflets thin, elliptic acuminate nearly entire with about three short obscure teeth towards the apex, narrowed at the base, median elliptic lanceolate, laterals with an oblique rounded base, nerves very fine and inconspicuous, 6 pairs, median 2.75—4 in. long, 1.2—2 in. wide; petiolule .4—.6 in. long; laterals smaller; petiolule .2, a few red hairs at the base of the petiolules. Inflorescence very slender, 3.5 in. long, peduncle nearly 3, bearing a slender tendril 1.5 in. long and sometimes twining itself. Spikes few, about 7, .4 in. long, pubescent, rhachis at base flattened broadly and narrowed to tip. Flowers distichous, pubescent, .05 in. long, sessile. Calyx lobes ovate, subacute. Petals 4, much larger, puberulous outside. Stamens 4, anthers large, oblong, filaments short. Ovary subglobose with a thick conic style, glabrous.

BORNEO. Sarawak; Siul (*Ridley*).

I collected this very curious vine in September 1905 in the forests on the Siul Hill near Kuching. It seems most nearly allied to *V. capillaris,* Ridl., but is very peculiar in the rhachis of the branches of the inflorescence being flattened as in *Pterisanthes* and the flowers distichous on the edge. It has the peduncular tendril of *Pterisanthes* which however occurs also in species of *Ampelocissus* and on the whole seems a connecting link between *Pterisanthes* and *Ampelocissus.*

Pterisanthes Dalhousiae, Planch.

This species was described by Planchon from a specimen from "Indes Orientales? Lady Dalhousie in herb. Delessert ex herb. Graham 1846." As no species of the genus has been met with except in the Malay Peninsula and Archipelago it is as he suggests improbable that it came from India. The description given is very short but it applies very fairly well to a plant collected by Mr. Curtis in Penang except that the leaves are smaller. Planchon gives no measurements of his specimen unfortunately, but says that they are much smaller than those of *P. cissoides,* "3—4 cent. de long sur ½—1 cent. de large."

I do not quite understand the passage. In the herbarium of Kew is a coloured drawing of a plant evidently this, of unknown origin from "Prince of Wales Island." Lady Dalhousie we know did collect in Penang.

Leea saxatilis, n. sp.

A low herbaceous plant. Leaves pinnate, petiole 18 in. long to 3 feet, smooth, red, leafy portion 12 in. or more, rhachis when young sparsely hairy, leaflets 9, oblong lanceolate acuminate with a long acute point, base rounded slightly oblique, terminal one larger narrowed to base, serrate or biserrate, submembranous above, glabrous with an elevate midrib beneath, the nerves 12—13 pairs elevate slender hairy tomentose, nervules and reticulations conspicuous, 4—7 in. long, 2 in. wide; terminal one 7 in. long, 2.6 in. wide; petiolules lowest .6 in., median .4, terminal 1 in. long. Flowers in a dense capitulum .75 in. through on a peduncle hairy .5 to 1.5 in. long, dull red, small globose. Bracts ovate acuminate hairy. Calyx thin, 5-lobed mucronate hairy. Petals as long, oblong obtuse, glabrous, calyptrate. Stamens with filaments long, anthers large oblong, urceolus with blunt rounded lobes. Fruit dull red, dry elliptic, depressed, .3 in. across, 5-lobed on a peduncle 3 in. long and a cyme of 1 in.

SELANGOR. On limestone rocks at the base of the Batu caves, (*Ridley* 305, 8260); also PAHANG on the Tahan river and at Kuala Dipang in PERAK and Lankawi (KEDAH).

SAPINDACEAE.

Allophyllus scandens, n. sp.

A woody climbing shrub with cinnamon brown bark densely covered with paler lenticels, glabrous except the very young parts and inflorescence which are puberulous. Leaves trifoliate, petiole thick 1.75 in. long, leaflets coriaceous, obovate, narrowed to the base, apex shortly blunt acuminate, entire, nerves about 8—10 pairs conspicuous though slender beneath, midrib moderately stout, 4—6 in. long, 2—3 in. wide, the median leaflets biggest, petiolules .2—.3 in. long. Inflorescence extra-axillary, peduncle 1—1.5 in. long, stout, deciduously puberulous, racemes usually 2 (occasionally only one, rarely 3) widely divaricate 1—1.5 in. long, usually unequal, rhachis pubescent. Flowers numerous, crowded small on pedicels longer than themselves, glabrous. Bracts minute, acuminate. Sepals glabrous, suborbicular, imbricate. Petals shorter, claw and bifid limb glabrous, scale silky. Fruit unknown.

SINGAPORE. Bukit Panjang, climbing on trees in swampy forest (*Ridley*). BORNEO. Mt. Gading, Lundu (*Haviland* 987), Baram (*Hose* 123).

In spite of the number of species of *Allophyllus* described more or less insufficiently by Blume and Radlkofer I can find no description of any species that fits this; but it seems to be nearest to *A. timorensis,* Bl.

ANACARDIACEAE.

Gluta virosa, n. sp.

A large branching tree 50 to 70 ft. tall. Leaves coriaceous lanceolate 9 in. long, 2.75 in. wide, acuminate at both ends blunt, nerves about 18 pairs slightly raised beneath, reticulations small fine conspicuous; petiole 2 in. long. Panicles in the terminal axils short. Calyx tube red spathaceous, .2 in. long, split on one side. Petals twice as long, linear oblong, white. Ovary pubescent. Fruit obovoid, smooth, light brown, fleshy, 2.5 in. to 4 or 5 in. long.

SELANGOR. Rantau Panjang (*Ridley*). PERAK. Gunong Pondok (*Kunstler*). PENANG. Telok Bahang (*Curtis* 3005), and Penara Bukit (*Curtis* 1527), Moniots Road (*Ridley*).

Native name "Rengas Kerbau Jalang," *i.e.* Buffalo on the warpath, on account of its poisonous character.

I have seen no good flowers of this plant though it does not seem to be rare. Some of the specimens I at first thought were *Gl. Wrayi,* King, but having seen good specimens of that species at Kew, I am now sure it is a distinct species. Malay collectors are very shy of gathering specimens of any of the Rengas plants, *Gluta* and *Melanorrhea,* as they are apt to be poisoned by them.

LEGUMINOSAE.

Bauhinia monticola, n. sp.

A slender glabrescent climber. Leaves ovate deltoid, tip acuminate very shortly bifid or entire, coriaceous glabrous, nerves 7, 2—2.5 in. long, 1.5—2 in. wide, petiole 1 in. long. Racemes short 1—2 in. long lax glabrous or nearly so. Pedicels long slender 1.5 in. long sparsely hairy. Bracts minute caducous. Buds ovoid. Calyx tube cylindric .4 in. long red, appressed hairy; lobes ovate .3 in. long hairy. Petals oblong obtuse, conspicuously veined when dry, sparsely hairy on the back, claw .1 in. long, blade .7 in. long, .5 in. wide. Stamens very short hairy at base. Ovary stalked, cylindric red-hairy on the sutures, .2 in. long. Style almost half as long, hairy on the upper edge. Stigma large peltate.

Selangor. Gunong Menkuang at 5000 ft. (*Robinson*). Perak. Gunong Kerbau, 4500—5500 ft. (*Robinson*).

This plant is certainly allied to *B. Kingii,* Prain, for which I at first mistook it and to *B. cornifolia,* Bak. but it has much larger flowers than either of these species. The flowers are apparently red. It belongs to the big set of showy Bauhinias which with their masses of yellow flowers turning red, make such a magnfiicent show in our forests, a group very characteristic of the Malay Peninsula for few of them seem to occur elsewhere.

Bauhinia holosericea, n. sp.

A big climber, branches, petioles and inflorescence densely red velvety. Leaves coriaceous, orbicular cordate, entire or retuse at the tip, nerves 7 or 9 elevated beneath, glabrous above, densely red velvety beneath on the nerves and reticulations, less so on the rest of the surface, 2—2.5 in. long, 2.4—3 in. wide, petiole 1.25 in. long. Panicles of a few stout axillary and terminal racemes from 2.5 lengthening to 5 in. long, the branches with numerous distinct elevated scars where the flowers have fallen, densely red, velvety. Bracts lanceolate acuminate, .1 in. long. Pedicels slender .6 in. long. Buds ovate acute with a shorter tube. Calyx tube cylindric, dilate at base, .2 in. long, lobes oblong 2 in. long, hairy. Petals oblong, rather short clawed, very red hairy .35 in. long, .2 in. wide, apparently red. Stamens fertile, 3, glabrous. Ovary hairy all over. Style about as long, slender, glabrous. Stigma peltate. Pod woody, firm, .8 in. long, 2.5 in. wide, oblong blunt, slightly narrowed at the tip. Seeds flat orbicular 1.1 in. long.

Perak. Forests at Temengoh (*Ridley* 14674).

This also belongs to the same group as the last, but seems distinct from any species in its very velvety stem, round leaves, and thick velvety racemes of which the rhachis is rough with the short processes from the base of the pedicel scars. The panicles are mostly really reduced to simple racemes, but occasionally have one or two branches.

Crudia lanceolata, n. sp.

A glabrous tree. Leaves with a rhachis 1.5 in. long; leaflets 3, subcoriaceous lanceolate or ovate acuminate obtuse, base rounded, quite glabrous, nerves fine 7 pairs, reticulations conspicuous beneath, drying grey 3.5—5.75 in. long, 1.5 in. wide, petiole .1 in. long thick. Raceme about 6 in. long, fairly stout, puberulous. Flowers distant, .3 in. across, on pedicels .3 in. long puberulous. Calyx tube short puberulous, lobes oblong reflexed puberulous outside, glabrous inside. Stamens glabrous. Ovary dense pale, woolly, stalk very short.

KEDAH. Lankawi; Gunong Rayah, (*Mohamed Haniff*).

This is allied to *C. gracilis,* Prain, but the leaves are lanceolate. The sepals, pedicels and rachis are pubescent, and the flowers are distinctly pedicelled.

ROSACEAE.

Parastemon spicatum, n. sp.

A glabrous shrub. Leaves coriaceous, elliptic, abrupt caudate acuminate, blunt, base long narrowed, nerves 6 pairs, 2.5 to 2.75 in. long, 1 in. wide, petiole .15 in. long. Spike axillary 3.5 in. long shortly peduncled with many very small sessile flowers. Bracts linear oblong. Calyx tube short campanulate, interior pubescent. Petals 0. Stamens 2 glabrous, from the edge of the tube.

BORNEO. Sarawak, Rejang, Sibu, (*Haviland* and *C. Hose* 3240); and 2 miles from Kuching (*Haviland* 723).

This species differs from the only other one, *P. urophyllum,* in its being a shrub, (whereas the other is a large stout tree) and in its flowers being sessile.

Parinarium rubiginosum, n. sp. *P. costatum* var. *rubiginosum,* Ridl. in Journ. F. M. S. Mus. iv. 143.

A tree about 20 ft. tall, the branches rather thick and when young covered with velvety yellowish tomentum. Leaves stiffly coriaceous, ovate lanceolate, acuminate, base rounded, glabrous above, beneath pale reddish, woolly, nerves strongly elevated about 20 pairs, midrib strong beneath, depressed slightly above, 3.5—4 in. long, 1.25—1.75 in. wide, petiole red-woolly .2 in. long. Panicles .5 in. long densely red woolly. Flowers few hardly .2 in. long. Bracts ovate acute woolly and hairy on the back. Calyx tube funnel-shaped deep woolly red outside, densely villous with long hairs inside, teeth ovate acute. Petals a little longer white oblanceolate rounded, edges pubescent. Stamens much shorter than sepals glabrous. Style very short with the ovary densely villous. Stigma discoid.

PAHANG. Gunong Tahan in woods across the Teku (*Ridley*).

The indumentum and short racemes and more coriaceous leaves are so different in this plant from those of true *P. costatum* that I consider it advisable to separate it specifically, though it is certainly allied to that species.

Pygeum coriifolium, n. sp.

Small tree, leaves coriaceous elliptic shortly blunt and acuminate, base very shortly narrowed, glabrous, nerves invisible above prominent beneath distant 5 pairs, midrib very prominent, reticulations invisible, 6 in. long 3.5 in. wide, petiole .5 in. long. Racemes solitary axillary .5 in. long, pedicels very short, puberulous. Calyx tube campanulate, pubescent, lobes 6 unequal, ovate acute pubescent, inside of tube glabrous. Petals 0. Stamens with filaments long, rather thick, 20. Style stout, shorter. Stigma clubbed, flattened, ovary short, globose, hairy.

PERAK. Temengoh and Kertai rivers; in forests (*Ridley*).

Allied to *P. parviflorum,* Teysm. but the leaves are larger and rather more fleshy, with distant and fewer nerves. The raceme is almost a spike, solitary, very short.

SAXIFRAGACEAE.

Polyosma grandis, n. sp.

A tree 40 to 50 feet tall with spreading branches. Stem 1.5—2 ft. through. Leaves membranous drying black, ovate elliptic, cuspidate, acuminate, base cuneate, margins denticulate, glabrous except the midrib and prominent 12 pairs of nerves beneath, secondary nerves nearly as prominent 6—7 in. long, 3—4 in. wide, petiole stout .5 long, flattened, pubescent. Raceme 6 in. long, peduncle 1 in. long, flattened, pubescent. Buds narrow cylindric blunt, pedicels .1 in. long, pubescent. Calyx-tube cylindric, lobes broad, ovate, acute as long as the tube. Petals subglabrous, narrow, linear, sparsely villous inside. Stamens shorter, filaments villous.

PERAK. Larut Hills at 3500 to 4000 ft. (*Kunstler* 3802). Flowers white, base greenish.

This plant was referred by King to *P. integrifolia,* Bl. but is clearly very distinct from that species and is most closely allied to *P. ilicifolia,* Bl. but from this it differs in its large size and very large ovate elliptic leaves and thick petals.

Polyosma conocarpa, n. sp. *P. mutabilis,* King in part.

Tree 20—30 feet tall, young parts appressed, hairy. Leaves membranous, elliptic lanceolate, acuminate, long narrowed to base, quite entire, glabrous, nerves about 8 pairs, conspicuous beneath inarching well within the margin, 3.5—6 in. long 1.25—2 in. wide, petiole .2 in. long appressed and hairy when young. Raceme 5 in. long appressed hairy. Flowers white, scattered or in little groups; pedicels .1 in. in fruit .2 in. Calyx tube campanulate, hairy, teeth very small, subacute. Petals linear .2 in. long sparsely hairy outside, villous inside. Stamens nearly as long. Fruit conoid, truncate strongly 4-ribbed when dry, .25 in. across at base, narrowing upwards.

SINGAPORE. (*Wallich* 8472). PERAK. Larut Hills (*Kunstler*), Birch's Hill (*Wray*). KEDAH. Lankawi, Gunong Raya (*Mohamed Haniff*). SUMATRA. Padang at Ayer Mantjur (*Beccari* 524). Forests up to 1000 ft. Flowers scented like privet.

This is quite different from Blume's *P. mutabilis* of Java in the fruit, which resembles that of *P. velutina,* Bl. as figured in Koorder's and Valenton's Boomsorten.

P. glaucescens, n. sp.

A small tree 20—30 feet tall, or shrub. Leaves elliptic to lanceolate acute, base narrowed, thick, coriaceous, glabrous beneath, nerves very obscure 3—3.5 in. long, 1.75 to 1.5 in. wide, petiole 1 in. long. Raceme pubescent 2.5—3 in. long. Flowers crowded .2 in. long. Buds oblong, dilate at base. Calyx very short funnel-shaped, lobes acute spreading, pubescent. Petals oblong, blunt, sparsely strigose outside, densely villous at tip inside. Stamens shorter.

PAHANG. Gunong Tahan (*Robinson* 5388, 5493; *Ridley* 16260): on the Padang and on Skeat's ridge (*Ridley* 16018, 16019).

I originally referred this to varieties *intermedia* and *lanceolata* of King's *P. coriacea,* but on closely examining it conclude it to be specifically distinct not only in the foliage, the leaves being thicker with very inconspicuous nerves, and usually glaucous beneath, but with shorter, broader flowers less pubescent and dilate at the base. The leaves vary in form somewhat, perhaps according to the amount of exposure on these rocky ridges and growth of the plant.

P. fragrans, Benn. Pl. Jav. Rar. 196; *Itea fragrans,* Wall. 8472.

The only plants of this I have seen are those collected by Wallich in SINGAPORE (mixed unfortunately with *P. Wallichii* from Khasia distributed under the next number in many distributions by accident) and one which appears the same collected in PERAK without locality by Scortechini. In Haviland's SARAWAK collections are two plants I take to be this, though the flowers are rather smaller .15 in. long. Dr. Haviland notes "Ovary 2-celled, 3 in one case, several ovuled."

They were obtained at Kuching (*Haviland* 944 and 1886).

Polyosma velutina, Bl. Mus. Bot. Lugd. Bat. I. 261.

To this species King refers a plant which occurs in PERAK at Goping and in Larut (*Kunstler*), the DINDINGS, Bruas (*Ridley*) and in PENANG on Penang Hill and at Balik Pulau (*Curtis* 1165) with bright yellowish green leaves, like those of *P. laetevirens*. He had not seen specimens of Blume's plant, nor have I seen types of Blume's plant. But I have not seen anything like King's species from Java; and the plant identified with *P. velutina,* Bl. by Koorders and Valeton (Boomsorten Pl. 195) and distributed as this plant No. 24404b is entirely different, and belongs to the section of *Polyosma* with membranous and black drying leaves. I conclude therefore that King's *P. velutina* cannot be Blume's plant and give the name of ***P. flavovirens*** to it. Blume's description of *P. velutina* is short; but the only species I have seen from Java with velvety leaves is the above mentioned plant from Koorders' collections and one from Zollinger No. 886: and these agree with Blume's description as far as it goes. It has membranous black drying leaves densely fuscous velvety beneath and curiously angled branches. The fruit is ovoid and .2 in. long in these specimens. Specimens collected at Kuching in SARAWAK by Haviland (No. 2914) seem identical.

Polyosma fasciculata, n. sp.

Leaves sub-coriaceous, elliptic sparsely toothed along the edge, base blunt and shortly narrowed, tip subacute, quite glabrous, nerves 6 to 10 pairs branched at the tip, rather obscure and not elevate, 4—6 in. long thick. Spikes rather slender 6 in. long puberulous. Flowers numerous, .4 in. long, sessile, fascicled in groups of 2—4 or 5. Buds cylindric blunt very sparsely puberulous. Bracts hairy acute. Calyx tube very short sub-companulate, lobes ovate acute spreading. Petals rather broad in proportion to length, sparsely villous inside. Stamens a little shorter.

KEDAH. Gunong Jerai (*Ridley* 5219).

King refers this dubiously to *P. coriacea,* King, but it seems to me in its small very sparsely hairy flowers much more nearly allied to *P. Scortechinii* a very little known plant which has however quite entire leaves and distinct pedicels to the flowers. The flowers in this species are not evenly scattered over the rachis, but clustered together in small lots.

Polyosma pisocarpa, n. sp.

Stem pale not angled; young parts velvety hairy. Leaves stiffly coriaceous elliptic, acute or obovate blunt, nerves fine about 12 pairs very irregular faint on both sides, glabrous except at first the midrib slightly hairy, 3—4 in. long, 1.5—1.75 in. wide, petiole .5 in. long rather stout sometimes pubescent. Raceme 6—7 in. long dense many flowered pubescent. Flowers green, pedicels stout much longer than calyx, hairy. Calyx tube campanulate, lobes triangular acute. Petals .35 in. long sparingly pubescent linear subacute villous inside. Stamens distinctly shorter. Style very slender. Fruit pea-shaped globose, .2 in. long, glabrous " blue " on pedicels slender, glabrous, .2 in. long. Seed smooth globular.

Borneo. Sarawak at Kuching and between it and Santubong (*Haviland,* 2911, 2912, 2913, 1464, 1988).

This species in nearest *P. coriacea,* King, but it has longer flowers on longer pedicels. The small pea-shaped blue fruit is peculiar. The raceme long and dense. The leaves as Haviland points out are of two forms, in one lanceolate and acuminate, in the other obovate and retuse, but there are more or less intermediate forms on the different specimens and in other respects the plants are the same.

HAMAMELIDACEAE.

Rhodoleia ovalifolia, n. sp.

A big shrub up to 10 feet tall with thick branches, the young parts densely red-hairy. Leaves, young lanceolate acute base acuminate, older 4 to 6 in. long 1.5 to 2 in. wide, rigidly coriaceous ovate with a rounded subcordate base, apex acute, at first red-scurfy beneath later becoming white-glaucous, nerves strongly elevate 6—8 pairs with some of the secondary nerves nearly as strongly elevate both nerves and reticulations depressed on the upper surface, 4—4.5 in. long, 2.5 in. wide, petiole at first densely velvety, later glabrous. Capitula solitary but often numerous axillary on the ends of the branches, one inch across. Peduncles thick decurved red, hairy. Bracts rounded, red, velvety, much larger than in *R. Teysmanni.* Petals narrow linear spathulate round at tip, .5 in. long, .1 in. wide, shorter than the stamens. Filaments .75 in. long, anthers oblong. Capsule .5 in. long, densely red-hairy.

Pahang. Gunong Tahan (*Robinson, Ridley*).

This is the third described species of the genus. One species *Rhodoleia Championi* of Hongkong, a shrub, has flowers as large as this, but the petals are much broader, and the plant is much more glabrous. *R. Teysmanni* of Sumatra and of the mountains of the Malay Peninsula is a tree. It is nearly glabrous, and the leaves are all lanceolate or oblong, capitula smaller, and fruit smaller all glabrous except a little pubescence on the bracts. *R. ovalifolia* is remarkable for the dense red velvety hair covering the shoots, peduncles, bracts and fruit. The leaves in Robinson's flowering specimens are much the shape of those of *R. Teysmanni* but more acuminate the nerves hardly more visible, but the midrib is red-scurfy. In the fruiting plants the leaves are quite different; they are remarkably coriaceous with the nerves depressed above and strongly elevate beneath. At first these leaves are red beneath with a deciduous red scurf; but this at last disappears and the leaves appear nearly white beneath. There is a certain amount of variation in the leaves of *R. Teysmanni* but nothing at all like this. The capitula densely red-hairy, are as big as those of *R. Championi* or nearly so but the petals are quite as narrow as those of *R. Teysmanni.*

SAMYDACEAE.

Casearia albicans, Wall.

There has been a considerable amount of confusion about this species which requires clearing up. In Wallich's Herbarium are three sheets of plants under the number 3197, labelled 3197, 3197.2, 3197.3. The only one labelled *C. albicans* is 3197.3 from Penang; and it appears to be *C. esculenta,* Roxb. No. 3197.2 from Singapore is in fruit, and seems also to be *C. esculenta,* No. 3197.3 from Penang, is identical with another plant No. 7432; and this is probably the plant described by King as *C. albicans,* Wallich. It has no name in Wallich's Herbarium, and is not the same as the plant so named by Wallich. It, therefore, being a distinct plant, requires a name. I call it ***C. latifolia.*** I have collected the plant myself on the side of the track to West Hill in Penang. What Clarke called *C. albicans* in the Flora of British India, King has already altered to *C. Clarkei.* No specimens of it occur at all in Wallich's Herbarium.

Casearia velutinosa, n. sp.

A shrub. Branches velvety, flexuous. Leaves thinly coriaceous, oblong to ovate, abruptly acuminate, base rounded or shortly narrowed, nerves 12 pairs ascending prominent beneath and depressed above, glabrous above, soft, tomentose beneath, 6—10 in. long, 3—4 in. wide, petiole tomentose .2 in. long. Glomeruli .15 in. across. Flowers .1 in. wide. Sepals 5, imbricate, pubescent, suborbicular oblong, hairy outside. Petals 0. Stamens 10, glabrous, anthers small, forming a tube with the spathulate oblong hairy staminodes. Ovary conic, glabrous. Stigma large, capitate.

PERAK. Gunong Keledang (*Ridley*). DINDINGS. Lumut and Bruas (*Ridley*).

Allied to *C. latifolia,* Ridl., but differing in the very tomentose branches, backs of leaves and petioles.

Homalium spathulatum, n. sp.

A glabrous tree. Leaves thinly coriaceous, elliptic acuminate, tip blunt, base narrowed, entire or undulate on the edge; nerves about 7 pairs, very fine and rather obscure, as are the reticulations, shining, 4 in. long, 1.5 in. wide; petiole .2 in long. Racemes axillary, simple, 3 in. long, tomentose, slender. Flowers numerous, not clustered, subsessile .2 in. across. Calyx-tube funnel-shaped, tomentose .1 in. long; lobes very narrow linear, 10, edged with long white hairs. Petals 10, a little longer, linear spathulate. Stamens shorter, 2 opposite each petal. Glands villous. Styles 3, glabrous.

DINDINGS. Pangkor (*Curtis* 1370).

This differs from *H. myrianthum,* Bak. in Kew Bull. 1896, p. 23, of Sandakan in the panicled racemes, funnel-shaped calyx and nearly sessile flowers.

BEGONIACEAE.

Begonia phoeniogramma, n. sp. *B. paupercula,* Ridl. in Journ. Roy. As. Soc. Straits Branch, 54, p. 42, not of King.

This little plant I find, on seeing the co-type of King's *B. paupercula* in Herb. Kew, is not the species he intended, I therefore give it the above name which refers to the red stripes on the small flowers. It was formerly very common on the path leading up to the Batu Caves, Selangor; but at my last visit I noticed that it had become scarce owing to a series of steps having been made up the slope where it grew. I have seen it nowhere else.

Begonia tricornis, n. sp. *B. Roxburghii,* Ridl. in Journ. Fed. Malay States Mus. iv. 20, not of DC. This plant is really more near allied to *B. inflata,* Clarke, of the Himalayas, but is distinct from all species of the section. It is the only one in the Malay Peninsula of the section *Casparya,* (with pulpy 3-angled not winged green fruit).

Begonia longicaulis, n. sp.

Stem elongated, red, with internodes 2.5 in. long, glabrous. Leaves ovate cuspidate, base deeply cordate, very unequal, 3 in. long, 2.5 in. wide; petiole 4—6 in. long. Stipules persistent, oblong with a terminal setiform process, 1.1 in. long, .2 in. wide. Peduncle 6 in. long, with 2 terminal flowers on peduncles 1 in. long. Flowers pinkish-white. Sepals of male flowers broad ovate rounded, .75 in. long and as wide; petals oblong-lanceolate, blunt, .3 in. wide. Stamens in a globose head on a short stalk.

PERAK. Gunong Kerbau (*Robinson*). PAHANG. Gunong Tahan (*Ridley*).

This plant is rather puzzling. It seems closely allied to *B. venusta,* King, with which species it occurred; but instead of having a creeping rhizome with leaves and peduncles arising directly from it, it has long erect stems with long internodes and large stipules with a long-setaceous point. In this, except for the form of the stipules which have no seta, it resembles *B. megaptera.* I cannot distinguish King's *B. megapteroidea* from *B. venusta.* Is it possible that this plant sometimes develops a caulescent stem, and that it is a form or state of *B. venusta?* The specimens are neither very complete.

Begonia eiromischa, n. sp.

Rhizome short, stout. Leaves fleshy, obliquely reniform peltate, acuminate, dark green, glabrous 3—3.5 in. long and as wide, nerves 7: petiole 2—3 in. long, with dense thick red wool. Peduncles glabrous, red, about 5 in. long. Flowers on two branches, small, .5 in. across, rose pink. Male sepals 2, broad, orbicular, rounded. Petals very narrow, linear. Style of female flower trifid; branches bifid. Capsule .6 in. long lateral wings very short, posterior rather thin, broad, oblong, rounded .3 in. long and as wide.

PENANG. Pulau Butong (*Curtis* 1028).

I have seen specimens of this and a good coloured drawing made in the Penang Gardens. It is undoubtedly near *B. Hasskarli* but differs conspicuously in the woolly stalk of the leaf. In the drawing the fruits are figured as equally 3 angled and bright red; perhaps they were not ripe when drawn.

Begonia rhoephila, n. sp.

Rhizome stout, creeping, 1 in. long. Leaves nearly or quite glabrous, lanceolate, erect, caudate-acuminate, base decurrent on the petiole, sparsely distantly toothed, apex closely toothed, nerves 4 pairs, often hairy on the underside, midrib always hairy with appressed hairs, 5—6 in. wide, petiole 1.5—4 in. long, glabrous or hairy. Peduncle 1—2 in. long in flower, stouter and up to 12 in. in fruit, glabrous. Flowers few, short pedicelled white tinted on the back or all pink. Sepals of the male flower oblong-ovate, .3 in. long, .2 in. wide. Petals narrower, oblong. Stamens numerous, anthers oblong, apiculate as long as the free filaments. Female flowers 5-petalled.

Capsule 1.1 in. across, .5 in. long; lateral wings blunt, triangular; posterior .75 in. long, .3 in. wide, oblong rounded, thick ribbed.

SELANGOR. Ulu Gombak, on rocks in the stream (*Ridley*).

This belongs to the jungle stream set of Begonias with narrow lanceolate leaves hardly or not lobed or unequal at the base, viz. *B. Kunstleriana* (*B. Scortechinii*) and *B. perakensis,* King. The latter has the leaves rounded. The former has them narrowed but not decurrent on the petiole as in *rhoephila* and very hairy. I take *B. Scortechinii,* King, of unknown locality to be a narrow leaved form of *B. Kunstleriana.*

ARALIACEAE.

Schefflera, Forst. This genus was made by Forster for two species of plants, one from New Zealand and the other from Fiji. Later the genus *Heptapleurum* was founded by Gaertner, to which a considerable number of Asiatic species were attributed. The difference between the two genera is however, too slight to warrant their being kept distinct and Harms in the Pflanzenfamilien has placed the *Heptapleurums* under the earlier name *Schefflera,* in which I follow him, excluding however, the genus *Brassaia* which appears to me sufficiently distinct. It may however, be found necessary to separate from *Schefflera* such abnormal plants as *S.* (*H.*) *Wrayi,* with racemose not umbellate flowers; and I am rather dubious of the following new species which has the number of stamens double that of the perianth lobes and ovary cells.

Schefflera polyandra, n. sp.

Leaves digitate; petiole 9 in. long; leaflets 5, oblanceolate or oblong lanceolate acuminate, blunt, base narrowed, edge serrate, coriaceous, glabrous, smooth, nerves 7 pairs faint, reticulations faintly visible beneath, 4—6 in. long, 1.25 to 1.75 in. wide, petiolule 1.3 in. long. Panicle 5 in. long, branchlets .5 in. long, umbels of 4—5 flowers; pedicels .2 in. long, stout. Calyx campanulate, edge thin, truncate, entire .1 in. long. Petals shorter, ovate, 5. Stamens 14 to 16; anther as long as filament. Style conic, cylindric. Ovary 8-celled.

PERAK. Gunong Keledang (*Ridley* 9763).

Arthrophyllum pinnatum, Clarke. Under this name in King's Materials two plants have been combined, one the true *A. pinnatum* of the Penang Hills. The other a smaller plant with many more smaller leaflets and smaller flowers, *A. alternifolium* Maingay, MS. a native of Mt. Ophir.

Arthrophyllum lancifolium, n. sp.

Tree. Branchlets slender, angled, yellow, glabrous. Leaves coriaceous, lanceolate caudate at the tip, acuminate at both ends, edge crenulate, undulate, midrib winged on both sides, nerves and reticulations fine, 3—3.5 in. long, 1—1.5 in. wide; petiole 1—2 in. long only .3 in.; uppermost leaves jointed with the stem. Umbels 4—5, on short pedicels .4 in. long. Flowers 10—13 in an umbel, .05 in. long. Calyx short campanulate; limb undulate, not toothed. Petals 5, calyptrate valvate, oblong, connate at the tip. Stamens 5; anthers oblong, connate at the tip. Stamens 5; anthers oblong, longer than the filament. Style columnar, stout. Ovary 1-celled.

PERAK. Ulu Batang Padang, at 4.900 feet (*Wray* 128).

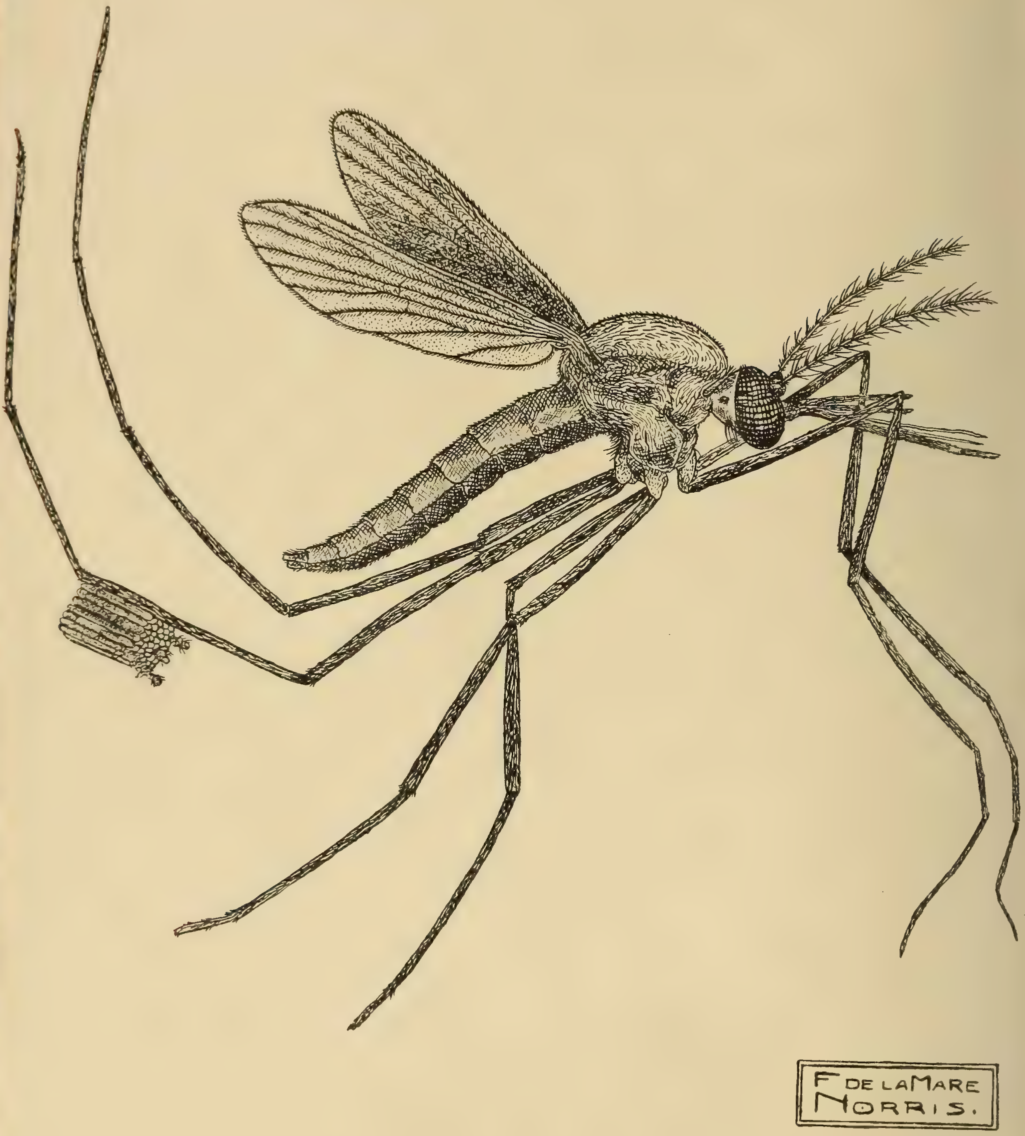
In the Kew Herbarium a sheet of this is written up by King as *Mastixia gracilis*, King, but the description of that species (based on a plant collected in Perak at 3,900 feet by *Wray* No. 1528) does not apply to the plant at all well, especially in the length of the petiole is given as .2—.25 in. long, and the inflorescence as cymose. This plant has umbellate inflorescence much resembling that of *A. alternifolium* and is clearly an Araliaceous plant.

Brassaia singaporensis, n. sp.

Leaves digitate, petiole over 6 in. long, base widely dilate; leaflets 15, stiffly coriaceous, oblong ovate, blunt,, rounded at both ends, 3—4 in. long, 1.75 in.—2.5 in. wide; petiolules 1.5 in. long. Panicle 18 in. long, stout; branches 1.5 in. long, thick, bearing heads of about 10 sessile flowers .5 in. through. Bracts 4, ovate, acuminate, longer than the calyx-tube. Calyx very short, margins undulate. Corolla calyptrate rounded, coriaceous. Petals connate 5. Stamens 9 to 12, filaments short, anthers oblong linear. Stigma subsessile conic.

SINGAPORE. Bukit Timah (*Ridley* 8061).

When dry this plant resembles much *B. actinophylla*, Br. of Australia and the flowers are as big, but the leaves are quite different in form and size. The genus consists of four or five species ranging from Sumatra through New Guinea to Australia.


F DE LA MARE
NORRIS.

CHÆTOMYIA FLAVA.

Photo.-engraved & printed at the Offices of the Survey of India, Calcutta, 1917.

A curious adaptation of habit to its environment of a Malayan mosquito.

By C. Strickland, M.A., B.C.
Travelling Medical Entomologist, F. M. S.

During a recent visit to the Gap, on the Selangor-Pahang boundary, which is at 2,800 feet, I observed a curious and interesting fact in the life of mosquito which seems worthy of record.

This mosquito, kindly identified for me by Dr. Stanton as *Chaetomyia* (*Leicesteria*) *flava,* Leicester, which had been caught in the resthouse and was kept in a test-tube, was observed to have attached to a hind-leg a mass which until closer examination, seemed to be one of those *Ceratopogon* which have a habit of attaching themselves to mosquitoes to suck out their body-juices. On examination however with a microscope it proved to be an ova-mass, and what was very interesting, from each ovum the head of a young larva was sticking out, the whole thing looking like a miniature nest of young sparrows.

The mosquito was introduced to a bottle in which was some water, when it immediately flew down to the water and dipped its hind-leg methodically into it. Immediately all the larvae came out of the ova-mass and swam away as livelily as a crowd of children coming out of school on a holiday.

On two occasions I observed this phenomenon and on another I caught a specimen of the mosquito with the ova-mass on its leg from which all the larvae had gone.

I think it seems clear that the mosquito ovideposits on its own leg and that the phenomenon represents a device by which the mosquito is enabled to deposit its larvae in collections of water which are inaccessible to it for ordinary deposition; perhaps in bamboos, or in the leafy axils of plants like common *kladi* or pig-lily,[1] or it may be to save the eggs from some danger which they might incur if they were laid on water.

I am much indebted to Mr. de la Mare Norris of the Agricultural Department, F. M. S., for the drawing which is given.

---

[1] Leicester in his monograph on *Culicidae of Malaya* 1908 says that he has found the adult larvae in bamboos and in coconut shells lying in the jungle.

Elaeocarpus Barnardii,

a new Species described from Perak.

By I. H. Burkill.

The Elaeocarps are abundant in the Malay Peninsula and are on the whole very much of one type: to this type Elaeocarpus Barnardii in general conforms.

It occurs close to Taiping at low elevations: and it is there known by the name Jiha. It is a tree with reddish chestnut bark on the branches, and with relatively small somewhat crowded obovate bright green smooth leaves, the margins of which are slightly and distantly toothed. The flowers are of average size, and, as is always the case in the genus, face earthwards along horizontal racemes. The fruits are of a deep blue.

The affinity seems to be to *Elaeocarpus cuneatus,* Wight, a widely spread tree of India, which southwards reaches Tenasserim.

Elaeocarpus Barnardii, inter Diceras *E. cuneato,* Wight, affinis: differt praecipue ovario et putamine.

Arbor, ramorum cortice castaneo vel rufo-castaneo. *Folia* obovata, apice obtusa, minopere acuminata, glabra, obscure 7—8-dentata, ad 9 cm. longa, ad 4 cm. lata, sed pleraque fere dimidio minora; nervi laterales 5—6, inter quos 2 vel 3 basales ad originem in pagina inferiori domatiam ferent: petiolus ad 3 cm. longus. *Racemi* 12—20-flori, vel foliis breviores vel aequantes vel paullulo longiores. *Flores* Dicerarum. *Sepala* linearia, 6 mm. longa. *Petala* obcuneata supra mediam laciniata, sepalis aequilonga. *Stamina,* plus minusve 20, 3 mm. longa; antherae apice barbatae, 2 mm. longae. *Ovarium* 3-loculare, pubescens. *Fructus* olivaeformis, ad 2 cm. longus vel paullulo longior, putamine laevi.

Perak. Haud procul ab oppido Taiping collegit H. B. F. Barnard, cum floribus mense Februario, cum fructu immaturo mense Martio, etiamque cum fructu sed maturo mense Januario.

Notes on Dipterocarps.

1. The Seedling of Anisoptera costata, Korth.

By I. H. Burkill.

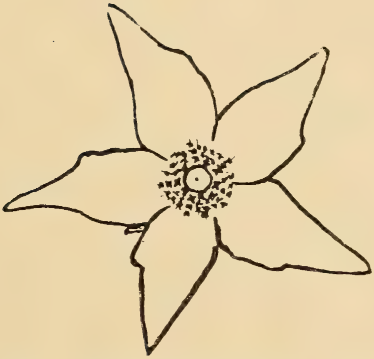


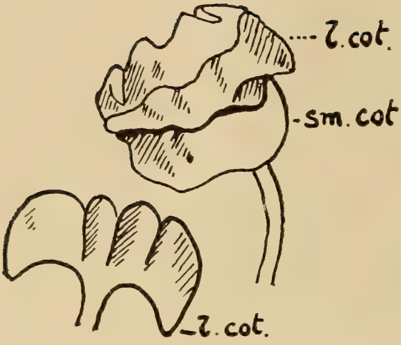
Fig. 1. Flower seen from below, × 2¼.

It is proposed to clear the way for a general review of the Malayan Dipterocarps by a series of short papers, of which this is the first. It deals with the seedling of *Anisoptera costata,* Korthals.

Anisoptera costata is a tall forest tree wild in the Botanic Gardens, Singapore, where two individuals flowered freely at the commencement of April, 1916, producing with new foliage, panicles of pendent white flowers from the ends of the branches. The shape of the flower is given above (fig. 1): the corolla does not fall.

The seeds from this flowering ripened about the end of June: and when they fell, a leaf-fall occurred, followed by a more abundant production of new leaves than had been the case when the flowers appeared.

The seeds germinated at once, lying on the ground. In germination the radicle is extruded, curves earthwards, and anchors itself; then the cotyledons are pulled out of the capsule by the straightening of the hypocotyl. The process is seen in progress in Figs. 2 and 5 below.



Eig. 2. Seedling at the time when the cotyledons have just been withdrawn from the capsule. *l. cot.* larger cotyledon; *sm. cot.* lesser cotyledon.

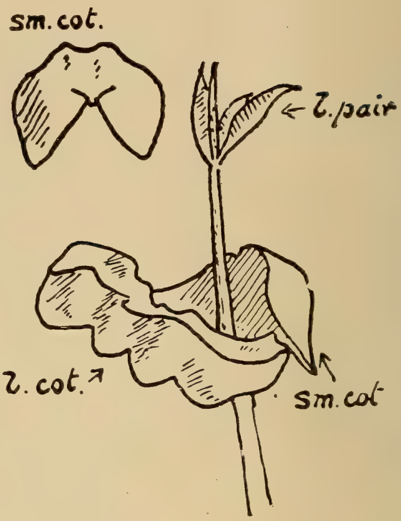


Fig. 3. Seedling at the time when the whorl of leaves is expanding. *l pair* the two larger of the four leaves.

The figures show how unequal are the two cotyledons: the larger is markedly four-ridged on the back (figs. 2, 3, and 5): the lesser is only obscurely four-ridged and is sagittate-reniform is outline. This inequality though very evident in *Anisoptera*, is yet greater in some other genera of the order, e.g. *Dryobalanops.*

During germination the petiole of the cotyledons elongates only a little. Brandis and Gilg, in Engler's Pflanzenfamilien, III. 6, (1895) p. 242, from very imperfect knowledge stated that great elongation is a character of the order, an error due to familiarity with the genus *Dipterocarpus,* where it occurs, and want of knowledge of other genera.

In several if not all of the species of *Dipterocarpus,* the cotyledons do not function as green leaves in the nourishment of the seedling and are not drawn out of the capsule. But in *Anisoptera costata* as well as in other genera the seedlings are greatly injured, if the withdrawing is prevented, or if they do not reach the light: for instance if the capsules are buried under the surface of the ground, so that the cotyledons are imprisoned, the seedlings in *Anisoptera* either die or languish; while the seedlings of *Shorea,* of several species at least, under the same circumstances die.

The cotyledons when they have been freed, and as the hypocotyl completes its straightening, part and come to stand more or less horizontally (fig. 6). Then from between them, the shoot pushes out and bears four leaves in a whorl. These leaves are to be seen in figure 3 with their faces folded together. The fifth leaf and all which follow are solitary. The four leaves of the whorl were fully developed in September, *i.e.* at three months and the fifth leaf generally in December or January, *i.e.* at six months.

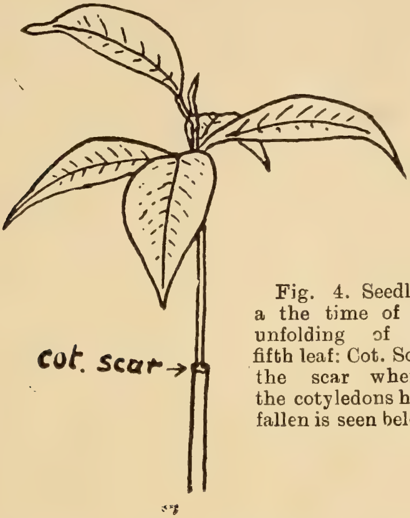


Fig. 4. Seedling a the time of the unfolding of the fifth leaf: Cot. Scar, the scar whence the cotyledons have fallen is seen below.

It is of particular interest that among the four leaves, inequality is found, that two are commonly larger than the others,—two which are not opposite, but contiguous, being those over the lesser cotyledon (fig. 6). The inequality is already obvious before the leaf-blades have expanded, and persists through life (figs. 7, and 8); but is sometimes very slight (figs. 9 and 10).

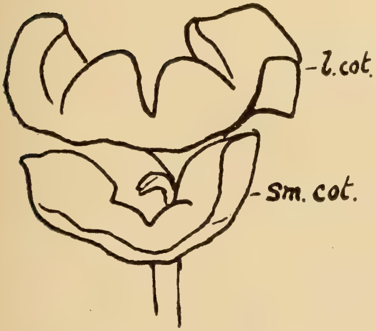


Fig. 5. The seedling as the cotyledons separate, seen obliquely from above: *l. cot*. larger cotyledon; *sm. cot*. lesser cotyledon.

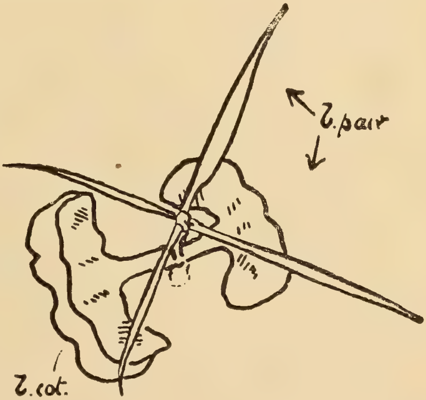
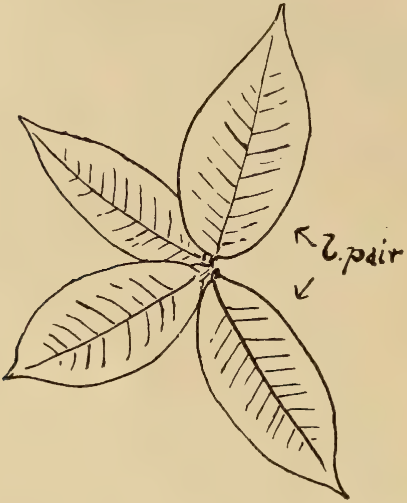


Fig 6. Seedling as the leaves of the whorl separate, seen from above: *l. pair*, larger pair of leaves.

The inequality of the cotyledons is apparently connected with the way in which they are packed in the seed. A compromise has been made in them there between fleshiness for the storage of food, and surface for assimilation later, resulting in extension beyond the diameter of the seed and in a rolling of the embryo on itself which places one cotyledon outside the other: and probably therefrom comes their inequality; but why the inequality should be repeated in the whorl which succeeds the cotyledons is not evident. *Shoreas* have



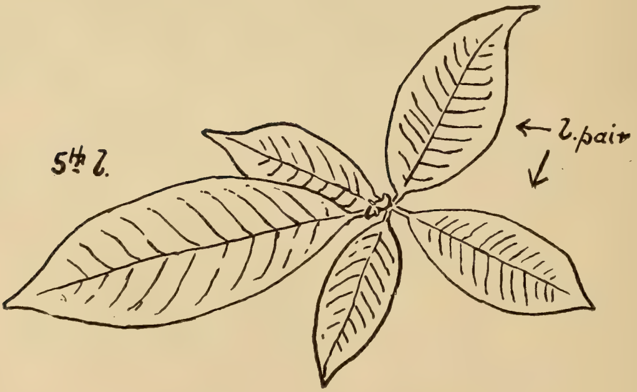
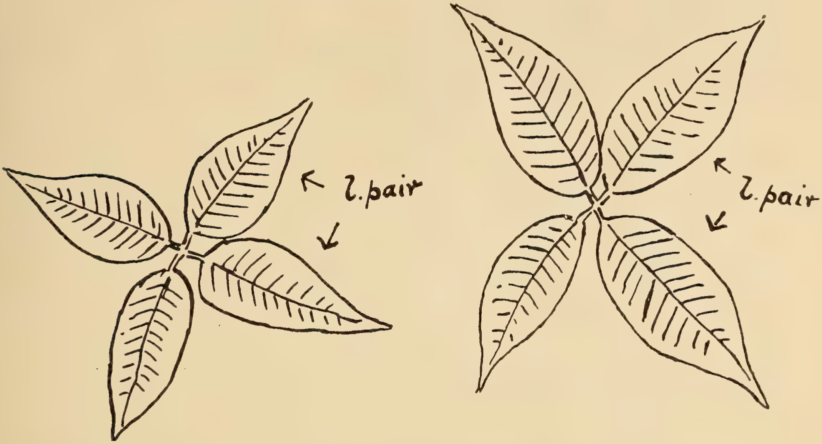


Fig. 7. above. The whorl of leaves expanded, showing the inequality: *l. pair*, the larger pair; and

Fig. 8. below. The whorl and the fifth leaf, seen from above.

more simple equal cotyledons and the first two leaves are equal. *Shorea* cotyledons are sagittately bilobed, and the first leaves are paired: but *Anisoptera* cotyledons are four ridged, and the first leaves are in a whorl of four. In both genera with the next leaf, the alternate condition sets in which persists through life.



Figs. 9 and 10. Two cases in which the leaves of the whorl differed from each other in very little.

There is no important difference in the microscopic structure of the petiole of a leaf of the whorl and of the fifth leaf: both in section about the middle exhibit (see fig. 11) a ring of normal cortex enclosing a ring of sclerenchyma within which is phloem and xylem, and an included bundle with the xylem towards the face of the leaf as drawn. Associated with the largest xylem vessels are resin ducts to the number of five. Close under the blade,

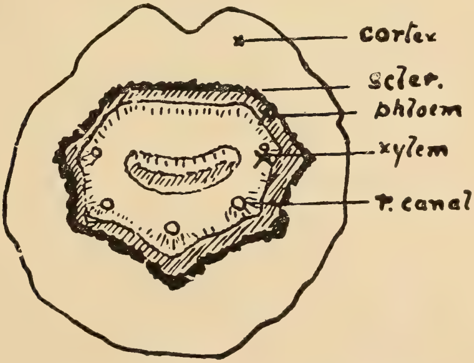


Fig. 11. Petiole in transverse section.
Scler., sclerenchyma: and *r. Canal*, resin canal.

through that part of the petiole which is a pulvinus, the sclerenchyma is wanting, while the ring of bundles is a little irregular and the cortex is thicker. Such changes are of course connected with the mobility required of the pulvinus: they take place in the petioles of the whorl in the same way as in the fifth leaf. And there is nothing further peculiar about these whorled leaves beyond the circumstances of their association and their inequality.

Compared with the adult leaves, they are of course much smaller, up to 8.2 cm. long by 4.1 cm. wide, and the vascular elements in the petiole, etc., in the large leaves are altered by the increased number of groups of larger xylem vessels in the ring, and by the space within this ring being completely occupied by a complex of bundles with much sclerenchyma. At the pulvinus the sclerenchyma is interrupted, and the ring somewhat irregularly broken up. But beyond the pulvinus, in the midrib of the leaf, the included bundles form up into orderly lines in concentric semicircles, which get less in numbers of their parts until near the tip of the leaf a condition is reached closely resembling the condition found in the petiole of the seedling leaves.

Brandis (in Journ. Linn. Soc. Bot. xxxi, 1895, p. 20) suggested sectioning the pulvinus for the study of generic characters; but the middle of the petiole promises more.

* * *

Some Rare Words.

Kutaha ; nakas ; turap ; tĕtĕrapan ; kop ; biram ; ganteh ; Sĕri Mĕnanti.

By R. O. Winstedt.

Kutaha. In the *Hikayat Raja-raja Pasai* (No. 66, March, 1914, of this Journal) there occurs a word کتاه several times (pp. 30, 35, 39, 41). Obviously from the contexts it is an interrogative particle. Mr. Mead romanized it wrongly *kĕtah*: it is found fully pointed in vowels—*kutaha*—in one of the 6 old Malay MSS. in the Cambridge University Library; vide p. 38 of Dr. Ph. S. van Ronkel's 'Account' of those MSS. in the "Bijdragen tot de Taal- Land- en Volkenkunde van N. I. 6*e* Vol. II." "Briefly" he observes, "after *apa, mana,* and *adakah,* this interrogative is seldom wanting," in those MSS. He suggests it may be compared with the Sundanese *kutan.*

Nakas. On p. 31 of Mr. Mead's transliteration of the same work there occurs a word نکس; *mĕngĕnakan sangga nakas bĕpĕrmata.* This word occurs also in a passage from the *Bustanu's-salatin* quoted by a Javanese scholar, Raden Dr. Hoesein Djajadiningrat on p. 570 of the "Tijdschrift van het Bataviaasch Genootschap, deel LVII, afl. 6." *Batu puteh di-ukir pĕlbagai warna dan nakas dan sĕlimpat dan tĕmbosa dan mega arak-arakan.* Klinkert gives it as ناکس It is possibly a motive in art,—where figures face one another perhaps: and derived from the Arabic *naks.*

Turap. In Perak painted wicker-work panelling for houses is called *tĕpas bĕrturap.* In Achinese *turab* means *to do masonry. Turap* occurs several times in the aforesaid passage from the *Bustanu's-salatin*:—*di-sisi gunong itu kandang baginda dan dewal kandang itu di-turap dĕngan batu puteh:........sapohon nyiur gading bĕrgĕlar Sĕrbat Jinuri di-tambak dĕngan batu bĕrturap dĕngan kapur:........jambangan batu bĕrturap.* In one passage a variant MS. gives *di-tĕrapi* for *di-turap;* and in the same context as the above sentences occurs *dan ada-lah dewal yang di-dalam itu bĕrtĕtĕrapan batu puteh*

Jour. Straits Branch R. A. Soc., No. 75, 1917.

bĕlazuardi pĕrbuatan orang bĕnua Turki. There is also a *kĕris tĕtĕrapan,* which Wilkinson translates 'a creese with a groove running up the blade': but *kĕris tĕrapang* means 'a creese with a sheath covered with metal,' and in Achinese *tĕrapan* is 'a metal envelope.' Wilkinson is certainly right in his explanation of *turap,* which must mean 'to dress, plaster, line.' His Dictionary says, "Covering; plastering; lining; giving a surface (of a different material) to anything, as a coat is lined or as a table is covered with green baize:"—I cannot state the authority for his instances. And perhaps *tĕterapan* is connected with *turap.*

KOP 'the cupola of the howdah of an elephant; *Hikayat Marong Mahawangsa* Wilkinson. In Achinese *khob* means "to cover with a dome, a cupola." And the same passage from the *Bustanu's-salatin* has *dan pintu-nya mĕngadap ka-istana, dan pĕrbuatan pintu-nya itu bĕrkop; di-atas kop itu batu di-pĕrbuat saperti biram bĕrkĕlopak dan bĕrkĕmunchakkan dari-pada sangga pĕlinggam."* *Kop* means any kind of 'dome, cupola.'

BIRAM. Wilkinson gives this word as meaning only 'elephant.' In the passage quoted under *kop,* it means 'a mythical snake with a head at both ends,'—a meaning it bears also in Achinese; a ring in the form of such a snake being called *unchiĕn tumpa biram.* This meaning of the words explains *chinchin patah biram,* a Malay 'puzzle-ring'—vide p. 89 "Circumstances of Malay Life" by myself.

GANTEH. In the folk-tales of *Sĕri Rama* and *Awang Sulong* occurs the lines

Anjong perak, gĕmala ganti
Bĕratap tila bĕrdinding kacha.

For *ganti* we should read *ganteh,* which means, 'thick in the centre, of pillars; barrel-shaped; round.' On p. 46 of Mr. Wilkinson's *Sĕri Mĕnanti* occurs *kĕrbau bungkal ganteh ia-itu bulat ujong tandok-nya, kadang-kadang jatoh bungkal-nya tĕtapi bĕrganti balek* (App. B. 5) and on p. 47 *Mungkal ganteh tiang tangga kĕchil di-atas di-bawah.* These two quotations corroborate the meaning given, except that *kadang-kadang jatoh bungkal-nya tĕtapi bĕrganti balek* has been added by some Malay philologist, to whom the real meaning of *ganteh* was unknown.

SERI MENANTI. The name of the seat of H. H. the Yamtuan of Negri Sembilan is explained by Malays as a place where the early settlers found rice of the kind called *sĕri* awaiting them. I would suggest that it is more probable it is a name reminiscent of *sĕri mĕnganti* (= *mĕnanti*) the 'waiting-hall' in the palace of Javanese princes.

The Malay Rice Cycle.

BY R. O. WINSTEDT.

In Kedah there is a phrase *bĕrtĕmu kop* for the 'completion of a cycle of years.' It is pretty certain that *kop* is derived through the Siamese *kab* from the Pali *kappa*, which in turn is the Sanskrit *kalpa*. It is used by Hindus and Buddhists to express an aeon during which the physical universe is destroyed. In Malay, it is applied to a cycle of a few years, generally to the 12 year cycle of the rice *pawang*, the years of which are designated by animal names. The cycle is common to Siamese, Cambodians, Chinese and Japanese. But both the word *kop* and the Malay names for the animals are from the Siamese and not from the Cambodian. The Cambodian form is *kalba* = *kalpa*, and the Cambodian words for the animals are more remote from the Malay words, while the Siamese words are almost identical:—

Malay	Siamese	Cambodian
chuat	*chuot*	*chut*
chalu	*chalú*	*chhlou*
kan	*khán*	*khal*
tau	*tho*	*thoh*
marong	*maróng*	*roung*
maseng	*maséng*	*mĕsañ*
mamia	*mamiă*	*momi*
mameh	*mamä*	*momê*
wauk	*wòk*	*woc*
raku	*raká*	*roká*
chaw	*cho*	*cha*
kun	*kun*	*kor*

The cycle is not known to the Mons.

This settles the problem discussed by Mr. Shaw on p. 7 of his paper on 'Rice Planting.' The linguistic evidence proves conclusively that the cycle was borrowed directly from the Siamese, who in turn may have borrowed from the Cambodians.

The Teaching of Malay in Europe.

By R. O. Winstedt.

It is commonly held that the best place to learn an Oriental language is in the country where it is spoken. To that facile contention Sir Charles Lyall gave an admirably considered answer in a memorandum addressed to the committee appointed in 1907 to consider the organisation of oriental studies in London. "In the first place, it is not the view which has dictated the establishment of the flourishing schools established by our commercial rivals in Germany and France. These nations have been quick to perceive the advantages of providing, in their own country, centres where persons intending to make a career for themselves in Asia may prepare themselves for their task; and, so far as Germany is concerned, it is generally admitted that they have been strikingly successful. In trade, it is found that German agents, owing to their knowledge of the languages and the habits and customs of the East gained at home, are liable to outstrip their English competitors even in our own dominions. The amount of trade which is carried on between India and the nations of continental Europe is immense and growing; and in this expansion it is scarcely open to doubt that the Germans owe much of their advantage to the training which they receive in Oriental methods in their own country. Secondly, much time is lost by persons, who defer until they land in the East the commencement of the study of Oriental subjects. Europeans require, in order to overcome the initial difficulties presented by Oriental languages, the guidance and assistance of Europeans who have already encountered and surmounted those difficulties. The genius of Oriental speech is so different from that of European languages that a student, if left to his unassisted efforts, is likely to waste both time and labour in approaching his task. Moreover, so far as my experience goes, the art of teaching is little understood in the East. The ordinary *munshi* of India, at any rate, does not understand how his pupil's intelligence should be directed or stimulated, on what points stress should be laid, how differences of idiom between the two languages should be explained and other like matters which make the difference between good teaching and bad." And then Sir Charles Lyall goes on to lay stress upon the personal influence of a European teacher as compared with a *munshi;* and again, on the value of European libraries with their stores of comparative literature. Every one of his points is corroborated by our experience in the Malay Peninsula.

Before the same committee the late Lord Cromer expressed the view that almost as important as instruction in language is instruction in "Oriental history, in religion, in all the social customs and the things that cluster round religion."

The result of the recommendations of the committee was the establishment of the School of Oriental Studies at Finsbury Circus, which was opened by His Majesty the King-Emperor in February (1917). On the faculty is a Lecturer in Malay, and Mr. C. O. Blagden, late of the Straits Settlements Civil Service, has been appointed first Lecturer.

The Report of the Committee has been published as an official blue-book and affords very profitable reading to all interested in Oriental languages. Sir Frank Swettenham is quoted as favouring preliminary training in England for six months or a year for cadets in our civil service. Sir Cecil Clementi Smith, also gave evidence, especially on the study of Chinese. Mr. Addis, joint manager of the Hongkong and Shangkai Bank gave evidence of the value of Chinese in commercial circles and the rarity of the self-denial required to master the drudgery of learning it in men once launched on business careers abroad. Mr. Ray writes a memorandum on the study of Melanesian languages.

The Report gives brief accounts of the instruction provided in Malay at Paris and Leiden.

Mr. Blagden has published the curriculum at Paris in Journal 50 of September 1908, and I have nothing to add to his account, except that the *Pancha-Tandaran* and *Chĕrita Jĕnaka* are now text-books, for pupils in their first year and that 'Papers on Malay Subjects,' Skeat's 'Magic,' Wilkinson's 'Dictionary' and my own 'Malay Grammar' are books consulted. In 1906-1907 there were 24 regular students of Malay at the École Spéciale des Langues Orientàles Vivantes.

At Leiden are taught (*a*) a general knowledge of the Indonesian languages, (*b*) Malay, (*c*) Javanese, (*d*) Old Javanese, (*e*) Sundanese, (*f*) Madurese, (*g*) Minangkabau (*h*) Batak. Synoptical lessons are given in history, religion, geography and ethnography, especially for students destined for the Dutch colonial civil service. The courses in Malay are designed for

(i) candidates for the administrative civil service of the Dutch East Indies

(ii) doctors of law who desire to become magistrates in the Dutch East Indies

(iii) candidates for the degree of Doctor of Languages and Literatures of the East Indian Archipelago.

For students in groups (i) and (ii) a practical knowledge of Malay is the aim of the course; for students in (iii) a more profound comparative study of Malay and the general linguistics of the Indian Archipelago.

The School of Oriental Studies in London is designed "to give instruction in the languages of Eastern and African peoples, Ancient and Modern, and in the Literature, History, Religion and Customs of those peoples, especially with a view to the needs of persons about to proceed to the East or to Africa for the pursuit of study and research, commerce or a profession." Special inter-collegiate arrangements with the London School of Economics will be made for instruction in the sociology and anthropology of the less civilized races. Inter-collegiate arrangements will also be made for instruction in phonetics; and modern phonetic methods will be used to facilitate the acquirement of correct pronunciation.

It is to be hoped that large local commercial firms and estates will recognise the value of preliminary instruction in Malay for young men embarking on careers in the Malay Peninsula; a value fully recognised by prominent business men acquainted with colonial needs. Cadets, too, might well spend the few months they pass in England between their selection for the service and their departure for the East in attending the School. For such students elementary practical teaching is provided. I had the pleasure of reading Mr. Blagden's opening lecture and can attest its illuminating simplicity. But, it is hoped that an advanced course also may be wanted. The library, the comparative method of teaching, the lectures on Arabic and Sanskrit at the same School would all be profitable to any man, on leave in London, who might desire to perfect his knowledge of Malay linguistics, literature and history. Sanskrit and Pali and India must always be to us what Malay and Javanese and the Dutch Indies are to Holland; but it is high time that some of us at least should get to know the best that is written about things Malayan, to recognise that there is a best, a standard of scholarship, in Malay studies. For those, who have that ambition, I can say confidently that a course of the lectures provided will dispel the hallowed notion that the highest authority on Malay matters is a *kampong* elder.

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Diet, Nutrition and Excretion of the Asiatic Races in Singapore.

No. 1, Medical Students.

By J. Argyll Campbell.

Introduction.

This research was undertaken in order to supply the local medical students with necessary information. Up to a short time ago the physiology of diet, nutrition and excretion which was placed before these students, was that of an European. The facts and figures which hold for an European are far from the truth when applied to an Asiatic. The results published in this paper have been obtained during the six months from October, 1916, to March, 1917, and although they are not considered to be more than an introduction to the subject they do form a basis to work upon when dealing with local Asiatic patients, whereas the European figures are certainly misleading. It is the intention of the author to continue this research for an indefinite period employing representatives of all classes and of all races of the community. These results apply to individuals leading sedentary lives similar to that of a medical student.

Technique.

There are Tamils, Malays, Chinese, Brahmins and Eurasians at the Medical School. One Tamil, one Chinese, and one Brahmin representative have been under observation every Monday, Wednesday and Friday for six months. A Malay has been employed for only two weeks. He partakes of the same diet as the Tamil. His results although few in number are interesting in that they confirm the results obtained from the Tamil. Results obtained at random from many other medical students confirm the results obtained from the students who have been under observation for six months.

The Tamil and Malay representatives live in the school hostel. The Chinese and the Brahmin live in their own homes. The Chinese, Brahmin and Tamil are senior students and rank amongst the most successful at the school. They have been demonstrators and class assistants for over a year. The author is indebted to them for their faithful co-operation.

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In all cases the food eaten is that of the student's choice. The daily diet varies slightly in quality. It does vary considerably in quantity. The food was weighed just before it was eaten. The compositions of the foods and their heat values have been taken from standard books on the subject (1).

For estimations of the kidney excretions care was taken to preserve the twenty-four hour specimens by the addition of 2 c.c. of a 5 per cent. solution of Thymol in chloroform. This is a matter of importance to doctors in Malaya. Ammoniacal fermentation proceeds very rapidly in this climate if the preservative is not added. The methods of quantitative analyses employed are those described by Cramer (2). Some of these methods are not as accurate as they might be, but they are employed in most hospitals because the results obtained are quite accurate enough from a clinical point of view.

On one or two occasions one or other of the representatives was indisposed for a day or two. No observations were made until health was restored.

Diet and Nutrition.

Chinese.—The maximum diet taken by the Chinese in twenty-four hours gives a heat value of 2131 kilocalories. It consists of bread 45 grammes, condensed milk 42, boiled rice 798, flour 128, pork 77, chicken 32, fish 50, cabbage 10, bananas 112. His minimum diet for twenty-four hours gives a heat value of 1141 kilocalories. It consists of boiled rice 524 grammes, egg 40, pork 37, beans 14, chicken 51, flour 53, fish 21, cabbage 14, gruel 65. His average diet for six months consists of protein 60 grammes, fat 43, carbohydrate 227, which gives 1577 kilocalories (Table II). This student weighs 92 lbs. and is 20 years of age. He has lost a small amount of weight during the experiment. Examination of his kidney excretion shows that he metabolises 57.8 grammes of the protein eaten, so that he uses most of the food he eats.

Tamil.—The maximum diet taken by the Tamil in 24 hours gives 1847 kilocalories, his minimum diet 1519. The former consists of bread 116 grammes, butter 14, bananas 112, cake 112, cocoa 14, beef 21, mutton 98, boiled rice 448, egg 70, sugar 14. The minimum diet consists of bread 120 grammes, butter 6, bananas 67, fish 118, beans 154, boiled rice 504, cake 56, eggs 90, sugar 14, cocoa 14. This student lived on this diet for six months, but estimations were made during three months of this period. The average diet for the three months gives 1672 kilocalories and contains 58 grammes of protein, 32 of fat and 277 of carbohydrate (Table II). The examination of his kidney excretion shows that he metabolises 51.5 grammes of protein, so that he does not use all of the food he eats. He is 26 years of age and weighs 143 lbs.

Malay.—This student partook of the same diet as the Tamil's for six months. He has only been under observation for two weeks.

His average diet for this period contains 57 grammes of protein, 31 of fat and 239 of carbohydrate, the heat value being 1502 kilocalories (Table II). His kidney excretion shows that he metabolises 50 grammes of the protein of his food. He weighs 125 lbs. and is 18 years of age. His religion does not allow him to eat pork otherwise he has a free choice.

Brahmin.—The maximum diet taken by this student gives 2922 kilocalories, the minimum 2175. The maximum diet consists of wheat 96 grammes, lentils 107, rice (weighed uncooked) 350, butter 76, sugar 14, milk 448; the minimum diet consists of wheat 63 grammes, onions 49, butter 90, beans 126, lentils 140, rice 198, sugar 14, milk 336. The average diet contains 83 grammes of protein, 68 of fat and 371 of carbohydrate (Table II). Judging from his kidney excretion this student metabolises only half of his protein food, namely 41.5 grammes. The other half is simply wasted. It is well known that many vegetarians partake of such bulky and indigestible foods that absorption is interfered with. This student is a strict vegetarian; Brahmins are not allowed to take any animal food except milk. His average daily diet has a heat value of 2493 (Table II) but it is evident that he uses a good deal less than this since only half of the protein food is actually used by his body. He weighs 110 lbs. and is 21 years of age. He has not altered appreciably in weight during the six months of observation.

Kidney Excretions.

Ammonia.—The total acidity of the urine cannot be accurately determined, but if the urine be neutralised by adding $\frac{N}{10}$ alkali, some indication can be obtained regarding the acidity. Since the figure thus obtained is of no known clinical importance no more need be said about it. After neutralising the urine as above, neutral formaldehyde is added. Owing to the liberation of acid which takes place when the formaldehyde has combined with ammonia, the urine acquires again an acid reaction. This second acidity is titrated again with $\frac{N}{10}$ alkali and this second titration is a measure of the amount of ammonia present. The average quantity of ammonia excreted by the Chinese is .61 gramme, by the Tamil .63, by the Malay .66 and by the Brahmin .57. An European excretes about .7 gramme (Table I). The smaller quantity of ammonia excreted by the Asiatic is due to the fact that he eats a larger proportion of vegetables than the European. Vegetable foods are very rich in bases which unite with the acids of the blood and thus a smaller quantity of ammonia is required from the tissues in order to keep the blood alkaline. Ammonia formation is the physiological remedy for deficiency of bases and is excessive in certain diseases, *e.g.*, acidosis.

Chloride.—This is estimated by Volhard's method in which all the chlorides are precipitated with an excess of standard silver

Table I. KIDNEY EXCRETIONS (Average figures).

Subject.	Period of observation.	Ammonia.	Chloride.	Urea.	Total Nitrogen.	Ammonia Coefficient.	Amount.	Specific Gravity.
Chinese in Singapore	6 months	.61 gm.	5.27 gm.	16.00 gm.	9.25 gm.	5.4%	1273 c.c.	1012
Tamil in Singapore	6 months	.63 „	5.21 „	14.41 „	8.24 „	6.3 „	1629 „	1009
Malay in Singapore	2 weeks	.66 „	8.00 „	13.35 „	8.00 „	6.8 „	1335 „	1010
Brahmin in Singapore	6 months	.57 „	6.34 „	11.08 „	6.64 „	7.1 „	1396 „	1014
European in Europe (8)	....	.70 „	11.00 „	35.00 „	16.00 „	3.6 „	1500 „	1015
European in Singapore	1 week	1.06 „	8.10 „	25.00 „	15.30 „	5.6 „	1560 „	1012

nitrate; the excess of silver nitrate used is determined by adding standard solution of ammonium sulphocyanate in the presence of a ferric salt. The Chinese excretes 5.27 grammes, the Tamil 5.21, the Malay 8 and the Brahmin 6.34. An European excretes about 11 (Table I). On experimental diets individuals have been kept in good conditions when the total content in sodium chloride is reduced to 1 or 2 grammes per diem. Bunge has called attention to the fact that among men and animals the desire for salt is limited for the most part at least to those that use vegetable food. The potassium salts of the vegetable food react with the sodium chloride forming potassium chloride and a sodium salt, both of which would be excreted by the kidney. The blood will thereby lose some of its supply of sodium chloride, whence the craving for more in the food (3).

Urea.—The method employed calculates the amount of urea by measuring the amount of nitrogen liberated from the urine by sodium hypobromite. Doremus-Heinz ureometer is employed. This method only gives approximate results. The Chinese excretes 16 grammes per diem, the Tamil 14.41, the Malay 13.35, the Brahmin 11.08 whereas the average figure for an European is 35 (Table I). It is well known that the amount of urea depends upon the amount of protein absorbed so that the greater the quantity of absorbable protein in the diet the greater the quantity of urea in the urine. About 80% of the total nitrogen in the urine is excreted in the form of urea.

Total Nitrogen.—This is estimated by Kjeldahl's method. The Chinese excretes 9.25 grammes per diem, the Tamil 8.24, the Malay 8.0, the Brahmin 6.64, the European figure being 16 (Table I). It is considered accurate to take the nitrogen excretion as an indicator of the amount of protein actually metabolised or used by the body in performing its work. Since nitrogen forms about 16% of protein, the amount of nitrogen excreted multiplied by 6.25 gives the amount of protein metabolised. The figures thus obtained are 57.8 grammes of protein for the Chinese, 51.5 for the Tamil, 50 for the Malay, 41.5 for the Brahmin and 100 for the European. We have seen that the Brahmin eats a good deal more protein than the other Asiatics (Table II), nevertheless he uses a smaller amount in metabolism, so that evidently a smaller proportion of the protein of his food is absorbed. This is due to its bulk and its indigestibility.

Ammonia Coefficient.—This is the amount of nitrogen, excreted as ammonia, expressed in terms of percentage of the total nitrogen. In an European it is 3.6%, in the Chinese student 5.4%, in the Tamil 6.3%, in the Malay 6.8%, and in the Brahmin 7.1% (Table I). It is higher in the Asiatics than in the European because the protein intake is greatly reduced in the Asiatics so that there is a low total nitrogen excretion. Of the Asiatics the Brahmin has the highest coefficient because he excretes the smallest

Table II. DIET AND METABOLISM (Average figures).

Subject.	Diet.	Period of observation.	Weight.	Protein in food.	Protein from Nitrogen in urine.	Fat in Food.	Carbohydrate in food.	Kilocalories in food.
Chinese in Singapore	mixed	6 months	92 lbs.	60 gm.	57.8 gm.	43 gm.	227 gm.	1577
Tamil in Singapore	,,	3 ,,	143 ,,	58 ,,	51.5 ,,	32 ,,	227 ,,	1672
Malay in Singapore	,,	2 weeks	125 ,,	57 ,,	50 ,,	31 ,,	239 ,,	1502
Brahmin in Singapore	vegetable	6 months	110 ,,	83 ,,	41.5 ,,	68 ,,	371 ,,	2493
European (Ranke)	mixed	....	160 ,,	100 ,,	100.0 ,,	100 ,,	240 ,,	2324
Bengali (McCay)	mainly vegetable	....	115 ,,	67 ,,	....	72 ,,	549 ,,	3196
Anglo-Indian (McCay)	mixed	....	..	95 ,,	....	56 ,,	467 ,,	2826
Filipino (Aron)	,,	....	115 lbs.	75 ,,	75 gm.	25 ,,	510 ,,	2632

amount of nitrogen, whereas the Chinese has the lowest coefficient because he excretes the largest amount of nitrogen.

Other Researches in the Tropics.

I am able to compare my results with those of two other observers. McCay has worked on the diet and nutrition of students in Bengal. He has found that the Bengali students take a smaller proportion of protein food than the Anglo-Indian students who are attending the same college. In opposition to Chittenden's views he attributes the better physique and greater muscular energy of the Anglo-Indian students to this fact. The Bengali student, who averages 115 lbs. in weight eats 67 grammes of protein, only a small quantity of which is obtained from animal sources, 72 of fat and 549 of carbohydrate. This diet has a heat value of 3196 kilocalories. The Anglo-Indian student eats 95 grammes of protein, a big proportion of which comes from animal sources, 56 of fat and 467 of carbohydrate. Although the Bengali eats a smaller amount of protein than the European, he is quite susceptible to kidney troubles (4). One is not justified in concluding that excess of protein is not harmful to the kidney, because there may be reasons to explain the kidney disease in the Bengali which are at present unknown. It is quite evident to physicians that the larger the amount of waste substance to be excreted by the kidney the more is the kidney taxed. In treating kidney disease there is no doubt that cutting down the protein excretion eases the kidney.

Aron (5) has made observations on Filipino students, with an average weight of about 115 lbs. They require 75 grammes of protein, 25 of fat and 510 of carbohydrate. This diet gives 2632 kilocalories (Table II).

Commentary.

As far as my experiments go they show that the medical students of Singapore require less food than the students of Bengal and the Phillipines (Table II). Probably this is due to the climates. In Singapore, Calcutta and Manila, the students wear the same tropical clothes, at least during the hot seasons. Therefore we can exclude the influence of clothes. Singapore has practically no seasonal change throughout the whole year; the temperature varies only slightly, the mean being 80°F. At Manila in the Phillipines there is some seasonal change, the months of November, December, January and February having a temperate climate. Bengal enjoys a winter. Again the humidity of the atmosphere is greater in Singapore than in Manila and much greater than in Calcutta. The climatic conditions in Singapore, therefore, are more likely to prevent the body losing heat, so that less food is required to keep up the body heat. The average weight in all three cases is about the same. The Singapore students do not take much muscular exercise. This is another probable cause of their small diet and it may be due to the climatic conditions. Europeans are not inclined to take much exercise in the Tropics but they all do so, because it is not possible to keep healthy on an European diet without regular exercise. The writer has made observations (Table I) upon his own kidney excretion, the results showing that he partakes of a diet similar to that taken by him in Scotland. He takes a good deal more exercise in Singapore than he did in Scotland, although he always took an active interest in out-door games in the latter country. Sir Patrick Manson and others have indicated that even in the case of Europeans who do take active exercise, a diet of moderate quantity is necessary to maintain health in the Tropics, if long residence is contemplated. An excess of food materials throws too much work on the excretory organs and owing to the usual free diaphoresis, the fluids taken are insufficient to flush the kidneys properly, or to secure adequate excretion of the solid products by that channel. This inadequate excretion will in time injure all the organs (6). The smaller amount of food taken by the Singapore student may be nature's way of counteracting the evil effects of the climate.

Judging from McCay's research the physique and the muscular energy deteriorate on a small amount of protein. Therefore good physique and great muscular energy are incompatible with prolonged residence in a climate like that of Singapore. By prolonged residence is meant a generation or more.

Although the Singapore students who have been under observation do not possess the muscular energy of an European student, they have done quite as much brain work as the average European student. The author has had nine years experience with European students and four years experience with Singapore students. It has been shown that brain work does not require extra food; in other words, a lazy student is just as expensive to feed as an hard working student. A man doing hard mental work in Atwater's respiration chamber gave the same results as when he was resting. Intellectual work has not been found to have any demonstrable quantitative or qualitative effect upon the metabolism of man (7).

Ranke's standard diet for an European living a sedentary life in Europe is appended (Table II) for purposes of comparison.

The figures obtained by examination of the Asiatic student's kidney excretions can be explained by the fact that the Asiatic eats a smaller amount of nitrogenous or protein food than the European. It is not likely that these figures will differ very greatly in the hard working Asiatic coolie, because the coolie does not eat much more protein than the student, but he increases the carbohydrate content of his diet.

Conclusions.

1. The results obtained from examination of the kidney excretion of local students indicate that the European figures are of no value when dealing with Asiatic patients.

2. The total nitrogen varies from 6.64 grammes in the Brahmin to 9.25 in the Chinese.

3. The urea varies from 11.08 grammes in the Brahmin to 16.00 in the Chinese.

4. The ammonia varies from .57 gramme in the Brahmin to .66 in the Malay.

5. The ammonia coefficient varies from 5.4% in the Chinese to 7.1 in the Brahmin.

6. The chlorides vary from 5.2 grammes in the Tamil to 8 in the Malay.

7. The Singapore student partakes of a smaller amount of food than the Philippine or Bengali student. This seems to be due directly or indirectly to the climatic conditions of Singapore.

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Hindustani Loan-Words in Malay.

By R. O. Winstedt.

In a brochure published in 1902 and entitled *Hommage au Congrés des Orientalistes de Hanoi de la part du Bataviaasch Genootschap van Kunsten en Wetenschappen* there appears an article by Dr. Ph. S. van Ronkel on the Hindustani element in the Malay language, which escaped my notice when I compiled my "Malay Grammar" and "English-Malay Dictionary." As the brochure is likely to come into the hands of few English readers. I propose here to extract a list of words, for which Dr. van Ronkel finds a Hindustani derivation.

Achita 'very fine white rice.' Probably the Hind. *achchhat* 'whole, unmilled rice, used in religious offerings.' Perhaps the Sanskrit *aksyata* 'unmilled.'

Artal, Hartal 'a yellow orpiment.' Hind. *hartâl* (from Sanskrit *haritâla*).

Akas, Angkas 'the firmament.' Hind. *âkâs* (Sk. *âkâsa*).

Unta 'camel.' Hind. *ûnt*.

Bai, in Batavia pronounced as Be, a title addressed to Muhammadan Bengalis. Hind. *bhâ'i* 'brother.'

Bandahari 'chief treasurer.' Hind. *bhandârî* (Sk. *bhândâgârika*).

Beti 'woman of the court.' Hind. *bêtî* 'girl.'

Chap 'seal.' Hind. *châp*.

Churi 'steal. Hind. *chorî*. Churi-churi 'by stealth.' Hind. *chorî-chorî*.

Chuka 'vinegar.' Hind. *chûk;* not directly from Sk. *cukra*.

Chulim, Chilam 'a fill of opium, in an opium-pipe.' Hind. *chilam* 'that part of the body of a hookah which contains the tobacco and the flame.'

Pelangking 'palanquin.' This is a word invented in its present form by the Portuguese. There is a Sk. word *paryanka,* or *palyanka* 'a bed,' from which we have Tamil and Telugu *palakkou* and Hind. *palkhi*.

Kapas 'cotton.' A debased or 'pracritised' form of the Sk. *karpâsa*. Possibly identical with the Hind. *kapâs*.

Kanji 'rice broth.' Hind. *kâñjî* (Sk. *kâñjika*).

Kunchi 'key, lock.' The Deccan form of the word is *kunchi;* the Hind. *kunjî;* the Sk. *kuñjikâ*.

KULI 'paid labourer.' The Hind. is *kûlî* and *kulî* but the word may be of Dravidian origin; connected with the Tamil *kûli* 'hire.'

GUDANG 'store.' There is a Hind. word *godân*, [which may be derived from the Anglo-Indian 'godown.' Probably 'Hobson-Jobson' is right in deriving it ultimately from the Dravidian: Telugu *gidangi*, Tamil *kidangi* 'a place where goods lie' from *kidu* 'lie.']

MUTI 'pearl' is not the Tamil *muttu* but the Hindustani *motî*.

Wilkinson's Dictionary has identified already BETI, CHAP, DOBI, RAKAT, ROTI, GHI as Hindustani.

LAGAM 'bit of a horse,' which I give as Hindustani in my "Grammar," is a Hindustani loan-word in Persian, and perhaps has been borrowed by Malay from the Persian.

Brandstetter's Indonesian Linguistics.

Translated by C. O. Blagden[1].

Reviewed by R. O. Winstedt.

In Malacca in the year 1825, on his mother's side from the well-known family of Neubronner, there was born van der Tuuk, who wrought a Copernican change in the study of Malay comparative philology. Malacca has been the mother of much important Malay literature, of the *Sĕjarah Mĕlayu,* the *Hang Tuah,* and the works of Munshi Abdullah: and then it was the birth-place of this great 'Indolog' van der Tuuk, who has gone without honour in his own place but found it in the pages of the "Encyclopaedia of the Netherlands Indies." We do not enshrine the careers of our students of Malay in an encyclopaedia; so, I should like to record here, that it was four years at Jasin, which inspired Mr. Blagden with his enthusiasm for Malay linguistics and so led to his translating the work under review.

This translation of Brandstetter's essays was badly wanted. Even to-day, how many British students of Malay are aware of the Copernican change wrought by van der Tuuk in Malayan philology? How many readers of this journal realize that Crawfurd's theories on the subject are no whit more valuable than his dictum to a learned society in Great Britain that whatever else Australia might produce, it could never breed sheep! How many admirers of the "Journal of the Indian Archipelago" know that Logan's Tibeto—Annam synthesis is no more fruitful or valid than that of Anglo-Israelites who find in the British the lost tribes of Israel! How many of us have appraised speculations on the syllable *bu, bun,* or *bung* in "words conveying an idea of roundness," to be as idle and valueless for scientific philology as Malay surmises that 'Sumatra' is derived from *sĕmut raya* or *sama utara*!

Maxwell printed his excellent "Manual of the Malay Language" in the early '80s; his introduction need not have been defaced by obsolete and untenable views, if he had read van der Tuuk's "Outlines of a Grammar of the Malagasy Language" printed in the "Journal of the Royal Asiatic Society of Great Britain" in 1865 (and reprinted in "Essays relating to Indo-China" in 1887.) That essay should have been a *point de repère* for English students of Malay philology as it has been for Dutch.

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[1] 'An Introduction to Indonesian Linguistics' being four essays by Renward Brandstetter, Ph. D., translated by C. O. Blagden, M.A., M.R.A.S.: published by the Royal Asiatic Society, London (7*s.* 6*d.*).

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In Holland the scientific study of Malayan philology was continued forthwith by Kern, Niemann, Brandes and others. No Englishman pursued the subject further; no Englishman read what the Dutch were doing; in the English language there has been no advance, no further *point de repère* till Mr. Blagden gives us now in English the cream of the philological work of Dr. Brandstetter, a brilliant Swiss scholar of the school of van der Tuuk and Kern.

The name and work of Brandstetter are not unknown to members of our branch Society. Mr. Blagden gave us an appreciation of his earlier work in Journal XLII, but since then Brandstetter has made great strides.

The present translation has been termed "An Introduction to Indonesian Linguistics." So vague has been the use of the word 'Indonesian' by British scholars, that it is well to define its meaning. For anthropologists, 'Indonesian' denotes a particular physical strain; for the student of language, it denotes the western division of the great Austronesian (or Malayo-Polynesian or Oceanic) family of speech, the division which irrespectively of racial elements is spoken by the inhabitants of the Philippines, the Malay Archipelago, the Malay Peninsula, the Mergui Archipelago and parts of Indo-China and of Formosa. 'Indonesian' is a term preferable to 'Malayan,' because Achinese or Javanese or Tagalog are no more Malay than Spanish is Italian. Mr. Blagden points out how "Malay in many ways is not a very typical member of the family; its grammar has been much worn down and simplified; and for various other reasons it is unfortunate that so many people are tempted to survey the whole Indonesian field, with its luxuriant diversity, through the rather distorting lens of a knowledge of Malay alone. There has been a very widespread tendency among Malay scholars to regard Malay as the standard or norm of the Indonesian family and to attempt to explain the differences which they noticed in the other languages as deviations from that standard; and that is very far from being the true view."

Of late years, the great Austronesian family has been linked definitively with an Austroasiatic family, which embraces a number of the languages of India and Indo-China, such as Munda, Khasi, Mon Khmer, Nicobarese and Sakai. Kern has shown how Indo-China was probably the point whence the proto-Malay descended on the Archipelago. When French research in Cambodia has progressed even further than it has to-day, when we have fuller dictionaries of Munda and Khasi and conversations recorded in Sakai and when Mr. Blagden has published his work on Talaing (or Mon or Peguan) inscriptions—perhaps some day the synthesis between the two great families may be worked out in detail. Meanwhile Brandstetter finds more than enough material awaiting study in the Indonesian section of the one family.

Four of Brandstetter's best essays are included in the present volume, and Mr. Blagden has supplied cross-references, where the subject matter overlaps.

"Root and Word in the Indonesian Languages" is the first essay. It deals with the extraction of roots from stem-words, which are normally dissyllabic in Indonesian languages; and it describes the morphological process by which stem-words have been constructed by means of formative syllables, usually prefixes, sometimes infixes more rarely suffixes,—formatives which cannot become roots themselves. Compare a series of stem-words and we find often a common syllable running through them, as *lok* through *tĕlok, kĕlok, jĕlok, pĕlok;* it may be inferred that all those dissyllabic words are constructed from *lok.* Maxwell surmised that in *tangkap* we have the Sakai *teng* 'hand.' It is not absolutely impossible, considering that a few Indonesian stem-words are built up by the juxtaposition of two roots. But it is exceedingly improbable and far-fetched: compare *chĕkap, tĕkap, tĕrkap, tangkap, rangkap, chakup, chĕkup, tĕkup, sĕrĕkup, tangkup*: we have the common syllables *kap, kup* and, as a matter of fact, *t* and *ch* will be found to be common Indonesian prefixes and *ng* a common Indonesian infix. The comparative method throws light, where the study of Malaý alone would lead nowhere: it shows for example how *sĕsal, sĕsip, tĕtap, sĕsak* are instances of reduplication of roots and appear in Madurese as *sĕlsĕl, sĕpsĕp, tĕptĕp, sĕksĕk*: and again how *dĕ-* is a common Indonesian formative making word-bases from interjections. Among the roots that can serve as word-bases, Brandstetter detects onomatopoeic interjections, other interjections, baby words, forms of address, monosyllabic prepositions and pronouns. He uses the comparative method with strict adherence to phonetic laws—a principle our smatterers in Malay philology have always failed to observe.

The second essay deals with "Common Indonesian and Original Indonesian" mainly from the point of view of phonetics and grammar. If a word or formative is found throughout the Indonesian area or in two or three widely distant parts of that area, then it must be regarded as common and primitive. Crawfurd's notion of Malay and Javanese influencing a number of tongues originally unconnected is exploded for ever. The essay is extraordinarily suggestive and does much to solve the vexed problems of Malay formatives, verbal substantival and adjectival. Incidentally Brandstetter shows how there were more monosyllabic words in the original language than are now in use and how the grammatical system was fuller than it is, for example, in modern Malay. And here I should like to invite attention to the nicer nuances of the formatives in old Malay literature like the *Sĕjarah Mĕlayu* and the *Sĕri Rama,* where later authors display carelessness or ignorance. How many modern writers could be trusted to write *jika ia bĕrbuang kuku,* "if he cut *his* nails."

The "Indonesian Verb," the third essay in this volume, does still more to explain the nature of the verb and its formatives. The importance of the subject for students of Malay will be obvious to all who have struggled with de Hollander's 'subjective-passive' theory or been amazed at Ophuijsen's attempt to discover conjugation in Malay and to explain the *di* in *di-makan-nya* as a contraction of *dia!* Brandstetter shows that some at least of the verbal formatives appear to have been once separate parts of speech, notably prepositions and articles. To prove how wide-based are his theories it is only necessary to point out that the following languages were selected as a basis for the study which resulted in this essay:—

Philippines: 1 Bontok—2 Tagalog.

Celebes: 3 Tontemboan—4 Bareqe—5 Macassar—6 Bugis.

Borneo: 7 Dayak—8 Basa Sangiang.

Java: 9 Old Javanese—10 Modern Javanese.

Islands towards New Guinea: 11 Kamberese—12 Kupangese—13 Rottinese—14 Masaretese.

Sumatra: 15 Minangkabau—16 Toba—17 Karo—18 Gayo—19 Achinese.

Islands at the back of Sumatra: 20 Mentaway—21 Nias.

Malay Peninsula: 22 Malay.

Madagascar: 23 Hova—24 Old Malagasy.

Essay IV was published in 1915 and deals with the "Phonetic Phenomena in the Indonesian Languages." Perhaps it is the most epoch-making of the essays in this volume; with its clear summary of the phonetic laws of the simple sounds of the Indonesian languages, its delineation of the *pĕpĕt* law, the R. G. H. law, the *hamzah* law, the law of the *mediae,* the diphthongs and aspirates and their laws. It is useless to try to abbreviate in a review an essay so packed with important matter. If ever an attempt is made to produce a comparative dictionary of an Indonesian language, the lexicographer will need to have this essay by heart.

It is to be hoped that Dr. Brandstetter will continue to write essays on the Indonesian languages of the quality of those in this volume; that Mr. Blagden will find time to translate them, and our parent Society the will to print them.

Even for those of us whose interest hardly extends beyond colloquial Malay, this volume should prove stimulating and illuminating. He also serves the cause of Malay studies who buys the few works that are written on the subject: and the present volume is infinitely the most important that has ever appeared in English on Malay philology.

Foliated Pattern in Malay Carving and Silverwork.

By R. O. Winstedt.

On p. 48 of my paper on "Malay Industries, Part I," "Arts and Crafts" (Kuala Lumpur, 1909), I wrote of Malay *repoussé* work. "It owes many of its patterns to Indian influence—the conventional lotus flower, the leaf of the sacred fig and so on—but there is not a technical term that is foreign for metal (gold and silver) tool or pattern, so that there would seem to be no reason why it should be inferred to be Indian in origin. Indeed it must be something more than coincidence that foliated pattern of the same chaste restraint and conventional character is the note of Malay wood-carving."

After a visit last year to the famous Bara-bodor in Java, I am persuaded that it is due to "something more than coincidence" that Malay and Javanese carvings and silverwork have their chaste foliated patterns:—namely, to Indian influence. The foliation carved between the panels illustrating the life of the Buddha on that wonderful memorial is identical with the foliation loved by the Malay craftsman, *e.g.* the socalled 'pine-apple' or 'side view of the lotus' pattern. This can be seen clearly, too, on some of the picture-postcards sold of the Bara-bodor. It would be interesting to know if there are similar foliated patterns on the ruins of Angkor Wat?

Contributions to our Knowledge of the Flora of Borneo.

By E. D. Merrill.

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In a previous paper on the Bornean flora* I briefly indicated the striking differences between the relationships of the Philippine-Moluccan floras on the one hand, and the Philippine-Bornean floras on the other hand, describing forty-eight new species of Bornean plants and one new genus, and crediting a number of other species previously described by other authors to Borneo. The present paper is in the nature of a continuation of the first one published; and in it I have described thirty-nine new species and credited about twenty-five additional ones to Borneo for the first time. The types of the new species proposed are preserved in the herbarium of the Bureau of Science, Manila, P. I.

In the present paper new species are described in the following families: *Gramineae, Cyperaceae, Rosaceae, Leguminosae, Rutaceae, Meliaceae, Euphorbiaceae, Vitaceae, Elaeocarpaceae, Tiliaceae, Thymelaeaceae, Ericaceae, Symplocaceae, Verbenaceae,* and *Rubiaceae.* Perhaps the one addition to the Bornean flora of greatest interest is the discovery of a representative of the genus *Faradaya* in British North Borneo, this characteristic genus having been known previously only from New Guinea, north-eastern Australia, and Polynesia. To the rather small list of species known only from Borneo and the Philippines are added *Artocarpus odoratissima* Blanco, *Knema glomerata* Merr., *Ellipanthus mindanaensis* Merr., *Grewia stylocarpa* Warb. (a variety in Borneo), and *Symplocos phanerophlebia* Merr. Genera new to Borneo are *Scleropyrum, Elaeodendron, Columbia,* and *Faradaya.* The new generic name *Hoseanthus* is proposed for the form that Ridley described as *Hosea,* on account of the previous use of the name *Hosea* by Dennstaedt for a different group of plants.

GRAMINEAE.

Andropogon, Linnaeus.

Andropogon serratus, Thunb. var. **nitidus** (Vahl) Hack. in DC. Monog. Phan. **6** (1889) 521.

British North Borneo, Usakan to Khota Balud, *Clemens 9757,* October 27, 1915.

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* Merrill, E. D. Notes on the Flora of Borneo. Philip. Jour. Sci. **11** (1916) Bot. 49-100.

Not previously reported from Borneo; India to China and Formosa and Malaya.

Oplismenus, Beauvois.

Oplismenus undulatifolius, (Ard.) Beauv. var. **imbecillis** (R. Br.) Hack. in Govt. Lab. Publ. (Philip.) **35** (1905) 82.

British North Borneo, Mount Kinabalu, Lobang, *Clemens 10422,* November 18, 1915.

This variety is widely distributed, extending from the Philippines and Malaya to Australia; new to Borneo.

Panicum, Linnaeus.

Panicum ridleyi, Hack. in Trans. Linn. Soc. Bot. **2** (1893) 401, *nomen nudum.*

Panicum latifolium, Hook. f. Fl. Brit. Ind. **7** (1897) 39, non Linn.

Panicum oryzoides, Ridl. Mat. Fl. Mal. Penin. (Monocot.) **3** (1907) 138, non Sw.

British North Borneo, Mount Kalawat, *Clemens 11159,* along trails in thickets, December 10, 1915.

This species has been reported from Borneo by Ridley, as *Panicum latifolium,* Linn. The Linnean *Panicum latifolium* is typified by a species common in the eastern and southern United States, and has nothing to do with the Indo-Malayan form. It is neither *Panicum oryzoides,* Sw., nor *P. zizanioides,* HBK., the latter cited by Ridley as a synonym under *Panicum oryzoides,* Sw.

India to the Malay Peninsula and Borneo.

Panicum cordatum, Büse in Miq. Pl. Jungh. (1854) 376.

British North Borneo, Mount Kinabalu at Kiau, *Clemens 10029, 10028,* November, 1915.

Malay Archipelago and the Philippines, not previously reported from Borneo.

Isachne, R. Brown.

Isachne clementis, sp. nov.

Culmis rigidis, usque ad 20 cm. altis, infra prostratis, radicantibus; *foliis* rigidis, lanceolatis, acuminatis, usque ad 3.5 cm. longis, basi plus minusve amplexicaulibus, subtus sparsissime pilosis vel glabris, margine prominente denticulatis infra leviter ciliato-pilosis, vaginis quam internodiis longioribus, leviter ciliato-pilosis; paniculis exsertis, 3 ad 4 cm. longis, paucifloris, ramulis brevibus, patulis; *spiculis* circiter 3 mm. longis; *glumis vacuis* subaequalibus, oblongis, obtusis,

3 mm. longis, quam fertilibus distincte longioribus, obscure 5-nerviis, apicem versus ciliato-setosis, marginibus inflexis; *glumis fertilibus* oblongo-ellipsoideis, rotundatis, 2 mm. longis, leviter apprese pilosis.

A rather rigid ascending, scarcely tufted plant, the culms glabrous, attaining a length of about 20 cm., below prostrate and rooting at the nodes. Leaves rigid, lanceolate, acuminate, 1.5 to 3.5 cm. long, 4 to 8 mm. wide, base rounded, somewhat clasping the stem, the lower surface with few, long, white, spreading hairs or glabrous, the margins rather prominently denticulate, the minute sharp teeth distinctly visible to the naked eye, below often ciliate-pilose with long white hairs; sheathes overlapping, ciliate-pilose with long, spreading, white hairs; ligule none. Panicles terminal, exserted, few-flowered, glabrous, 3 to 4 cm. long, the branches few, solitary, spreading, at most 1 cm. long, each bearing 2 or 3 spikelets, the pedicels of the lateral spikelets about 1.5 mm. long, of the terminal one longer. Empty glumes equal, oblong, obtuse, 3 mm. long, margins inflexed, somewhat spreading, obscurely 5-nerved, toward the apex sparingly ciliate-setose, distinctly exceeding the flowering glumes. Flowering glumes two, oblong-ellipsoid, rounded, 2 mm. long, sparingly appressed-pilose.

BRITISH NORTH BORNEO, Mount Kinabalu, Kemberanga, altitude about 2100 meters, *Clemens 10503,* November 15, 1915.

In many characters approaching *Isachne pangerangensis,* Z. & M., but not densely tufted, much taller, with larger leaves, and quite different spikelets. In its empty glumes distinctly exceeding the flowering glumes it approaches *Isachne kunthiana,* W. & A., but is not otherwise closely allied to that species.

Isachne kinabaluensis, sp. nov.

Laxe caespitosa, erecta, rigida, usque ad 45 cm. alta, culmis simplicibus, nodis barbatis, vaginis margine ciliatis, cetero glabra vel subglabra; *foliis* lanceolatis, rigidis, subcoriaceis, acuminatis, usque ad 8 cm. longis, margine cartilagineis, integris vel minutissime ciliato-denticulatis; *paniculis* longe exsertis, usque ad 9 cm. longis, paucifloris, ramis patulis, inferioribus usque ad 5 cm. longis; *spiculis* 2 mm. longis, longe tenuiterque pedicellatis; *glumis vacuis* orbiculari-ellipticis, rotundatis, glabris vel apice obscurissime ciliatis, 7- vel 9-nerviis; glumis *fertilibus* ellipticis, 1.7 ad 2 mm. longis, basi et apice et margine parcissime ciliatis.

A laxly tufted, erect, simple, rigid, nearly glabrous grass attaining a height of about 45 cm., the culms smooth, glabrous, the nodes bearded. Leaves rigid, subcoriaceous, acuminate, base somewhat rounded, 3 to 8 cm. long, 5 to 9 mm. wide,

glabrous, or the margins very minutely ciliate-denticulate, often, however, entire, cartilaginous; sheaths generally overlapping, glabrous except the prominently ciliate margins; ligule none. Panicles lax, pyramidal, long-exserted, up to 9 cm. in length, few-flowered, the branches solitary, spreading, the lower ones up to 5 cm. in length, quite smooth and glabrous, the pedicels slender, 6 to 15 mm. in length. Spikelets 2 mm. long; empty glumes equal, orbicular-elliptic, rounded, 7- or 9-nerved, glabrous or the apex very obscurely and sparingly ciliate; flowering glumes elliptic, 1.7 to 2 mm. long, rounded, the base, apex, and margins sparingly ciliate, otherwise glabrous.

BRITISH NORTH BORNEO, Mount Kinabalu, Paka Cave to Lobang, between the altitudes of 1450 and 3000 meters, *Clemens 10704,* (type) November 15, 1916; near Kiau, altitude about 930 meters, *Clemens 10029,* mixed with *Panicum cordatum,* Büse.

Probably as closely allied to *Isachne beneckii,* Hack., as any other species, differing, however, in numerous characters.

Agrostis, Linnaeus.

Agrostis infirma, Büse in Miq. Pl. Jungh. (1854) 342.

BRITISH NORTH BORNEO, Mount Kinabalu, Low's Peak, *Clemens 10631,* altitude about 3600 meters, November 13, 1915.

This species has previously been reported only from Java; the Bornean specimen agrees closely with the original description, and agrees with Javan specimens kindly supplied by Mr. Backer of Buitenzorg. As noted by Mr. Backer *Agrostis infirma,* Büse, is not clearly distinguishable from the widely distributed *Agrostis alba,* Linn.

Agrostis canina, Linn., var. *borneensis,* Stapf, is represented by *Clemens 10630,* from the same locality as *A. infirma,* Büse, while a third species, much more delicate than either of the above, is represented by *Clemens 10632,* from the same general altitude, a single specimen.

CYPERACEAE.

Mapania, Aublet.

Mapania borneensis, sp. nov. § *Pandanophyllum.*

Rhizoma descendens, ligneum; *foliis* usque ad 50 cm. longis et 2.5 cm. latis, 3-nerviis, apice abrupte caudato-acuminatis, integris vel margine in partibus superioribus minutissime denticulatis, infra longe gradatim angustatis, haud petiolatis, basi haud dilatatis; *pedunculis* 12 ad 20 cm. longis, monocephalis, basi bracteis distichis instructis; *capitulis* ovoideis, circiter 2 cm. longis, spicis solitariis; *spiculis* numerosis confertis, circiter 8 mm. longis; *bracteis* 4 ad 6, oblongo-ovatis vel ovatis, obtusis vel retusis, circiter 1 cm. longis; *fructibus* oblongis, utrinque angustatis, 5 mm. longis, haud trigonis, rostratis; *stylis* 3-partitis.

A perennial plant, the rhizome erect, woody, stout, about 1 cm. in diameter. Leaves numerous, about 30 cm. long. 1.7 to 2.5 cm. wide, glabrous or the margins in the upper part minutely denticulate, 3-nerved, apex abruptly contracted into a caudate, denticulate appendage about 2 cm. in length, below very gradually narrowed, the lower part about 1 cm. wide, base not inflated. Scapes from below the leaves, slender, terete, 12 to 20 cm. long, the lower 4 to 6 cm. supplied with brownish, elongated, distichous bracts, the lower ones about 1 cm. long, the uppermost 4 to 5 cm. in length, usually from 4 to 6 bracts to each scape; heads solitary, terminal, ovoid, consisting of a single spike about 2 cm. in length, composed of numerous, densely crowded, 8 mm. long spikelets; bracts subtending the spike 4 to 6, subcoriaceous, oblong-ovate to ovate, obtuse or retuse, about 1 cm. long; glumes about 8 mm. long; nutlet oblong or oblong-ovoid, narrowed at both ends, terete, about 5 mm. long, smooth, prominently rostrate; style 3-partite.

British North Borneo, Mount Kinabalu, Gurulau Spur, on forested hillsides, *Clemens 10785,* November 27, 1915.

Well characterized by its leaves being abruptly contracted at the apex into a slender caudate appendage and very gradually narrowed toward the base, not contracted into a petiole, its inflorescence composed of a single spike, the scape supplied in the basal part with prominent elongated bracts. It may be as close to *Mapania longiflora,* C. B. Clarke, as any other species, but is not closely allied to this form.

Mapania montana, Ridl. in Journ. Str. Branch Roy. As. Soc. **44** (1905) 206.

British North Borneo, Mount Kinabalu, Kiau and Marai Parai Spur, *Clemens 9945, 10872, 11092, 10870,* November and December, 1915, on forested slopes.

This species was described from *Haviland 1801* collected at Panokok, Mount Kinabalu. The recently collected material differs from Ridley's species, as described, in its notably longer petioles, these in some cases attaining a length of 35 cm.

Pycreus, Beauvois.

Pycreus odoratus, (Linn.) Urb., var. **holosericeus,** (Link).

Cyperus holosericeus, Link, Hort. Berol. **1** (1827) 317.

British North Borneo, Mount Kinabalu, Kiau, *Clemens 10040,* November 24, 1915.

This form has not previously been reported from Borneo. It is identical with Philippine material referred to Link's species by Kükenthal.

Kyllinga, Rottboell.

Kyllinga odorata, Vahl, var. **cylindrica**, (Nees) Kükenth.

Kyllinga cylindrica, Nees in Wight, Contrib. (1834) 91.

British North Borneo, Jesselton, *Clemens 9823*, December 14, 1915.

Widely distributed in the tropics of the Old World; not previously reported from Borneo.

Eleocharis, R. Brown.

Eleocharis afflata, Steud. Syn. Pl. Cyp. (1855) 76.

British North Borneo, Kiau, *Topping 1527*, in wet places, altitude about 1060 meters. India to Luzon and Java.

COMMELINACEAE.

Aneilema, R. Brown.

Aneilema scaberrimum, (Blume) Kunth, Enum. 4 (1843) 69.

Commelina scaberrima, Blume, Enum. Pl. Jav. 1 (1827) 4.

Aneilema protensum, Wall. Cat. (1831-32) No. 5218, *nomen-nudum.*

British North Borneo, Mount Kinabalu, Kiau, *Topping 1530*, November 3, 1913, on wet hillsides, altitude about 930 meters.

India to Sumatra and Java; not previously reported from Borneo.

MORACEAE.

Artocarpus, Forster.

Artocarpus odoratissima, Blanco, Fl. Filip. (1837) 671.

Artocarpus tarap, Becc. Nelle Foreste de Borneo (1902) 626.

British North Borneo, Sandakan, *Villamil 200*, April 9, 1916, from cultivated trees, locally known as *tarap*.

I cannot distinguish this Bornean form from the Philippine *Artocarpus odoratissima*, Blanco, and have accordingly here reduced Beccari's *Artocarpus tarap* as a synonym. *Artocarpus odoratissima*, Blanco, is widely distributed in Mindanao in cultivation, there known as *marang*, and is also known from several localities in Mindoro, there known as *oloy*.

Ficus, Linnaeus.

Ficus callosa, Willd. Mem. Acad. Berl. (1789) 102.

British North Borneo, Sandakan, *Villamil 179,* March 12, 1916, in thickets at an altitude of about 85 meters.

Ceylon to Burma, the Malay Peninsula, and Java; new to Borneo.

SANTALACEAE.

Scleropyrum, Arnott.

Scleropyrum maingayi, Hook. f. Fl. Brit. Ind. **5** (1886) 235.

British North Borneo, Sandakan, *Villamil 154,* February 20, 1916 in forests near the Reservoir, altitude about 80 meters. Trunk spiny, the fruiting racemes borne on the branches, the fruits yellowish-green.

So far as I can determine from the published descriptions this specimen is referable to Hooker's species. The leaves are somewhat smaller than described by Gamble,* but in essentials the Bornean form appears to be the same as that from the Malay Peninsula and Penang. The genus is new to Borneo.

MYRISTICACEAE.

Knema, Loureiro.

Knema glomerata, (Blanco) Merr.

Sterculia glomerata, Blanco, Fl. Filip. (1837) 764.

Myristica heterophylla, F. Vill. Novis. App. Fl. Filip. (1880) 178.

Knema heterophylla, Warb. in Nov. Act. Akad. Naturf. **68** (1897) 573, *t. 25, f. 1-2.*

British North Borneo, Kalabakan watershed, along the Pinayas River, *Villamil 241,* October 7, 1916, altitude 10 meters.

This specimen, although with very immature fruits, comes well within the range of variation of the very common *Knema glomerata,* (Blanco) Merr., which is found throughout the Philippines at low and medium altitudes; the species has not, however, previously been reported as an extra-Philippine one.

ROSACEAE.

Parinarium, Aublet.

Parinarium costatum, Blume ex Miq. Fl. Ind. Bat. **1** (1855) 354.

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* Jour. As. Soc. Beng. **75**^{2} (1912) 276.

British North Borneo, Sandakan, *Villamil 204,* January 8, 1916, along roadsides, altitude about 100 m.

Perak, Malacca, Penang, Singapore, Sumatra, and Java.

Parinarium glaberrimum, Hassk. in Flora, **27** (1844) 583.

British North Borneo, Silimpopon, *Villamil 196,* September 15, 1916, on forested slopes, altitude 500 meters.

I am unable to distinguish this form specifically from Hasskarl's species, which extends from Perak, through the Malay Archipelago and the Philippines to Polynesia, and which has numerous synonyms, including *Parinarium scabrum,* Hassk., *P. laurinum,* A. Gray, *P. warburgii,* Perk., and *P. curranii,* Merr. It was first described by Rumphius as *atunus.*

Pygeum, Gaertner.

Pygeum pachyphyllum, sp. nov. § *Sericospermum.*

Frutex vel arbor parva perspicue ferrugineo-pubescens; foliis coriaceis, ellipticis, integris, usque ad 16 cm. longis, breviter acuminatis, basi truncato-rotundatis vel leviter cordatis, nervis utrinque 10 ad 12, prominentibus, in pagina superiore cum reticulis laxis impressis; *racemis* axillaribus, fasciculatis, dense ferrugineo-pubescentibus, circiter 1 cm. longis; *sepalis* 6, anguste oblongis; *ovario* dense ferrugineo-hirsuto; *fructibus* parce ferrugineo-villosis, seminibus parcissime ciliatis.

A shrub or a small tree, the branches, branchlets, inflorescences, and the leaves on the lower surface prominently and in part densely ferruginous-pubescent with short, spreading hairs, the branches and branchlets terete. Leaves coriaceous, elliptic, entire, 12 to 16 cm. long. 7.5 to 10 cm. wide, the upper surface dull-olivaceous, glabrous, or when young more or less ferruginous-pubescent especially along the midrib and lateral nerves, the lower surface very densely ferruginous-pubescent on the midrib and lateral nerves, with scattered hairs on the reticulations and surface generally, apex shortly acuminate, base truncate-rounded to shallowly cordate, the glands obscure, not projecting; lateral nerves 10 to 12 on each side of the midrib, spreading-curved, very prominent, the nerves and primary lax reticulations impressed on the upper surface; petioles densely ferruginous-pubescent, 5 to 8 mm. long. Racemes axillary, fascicled, short, few-flowered, densely ferruginous-pubescent, about 1 cm. long; pedicels 2 mm. long. Calyx-tube slightly enlarged upward, about 2 mm. long, sparingly pubescent, the lobes 6, narrowly oblong, pubescent, about 1.2 mm. long. Stamens about 25; filaments 2.5 to 4 mm. long. Ovary narrowly ovoid, densely ferruginous-pubescent, including the style about 6 mm. long, the style pubescent below, glabrous above. Fruits dark-brown when dry, slightly compressed, about 6 mm. long, 8 mm. wide, usually 2-seeded, sparingly ferruginous-villous or ciliate, the seeds with few, long, shining, pale hairs.

BRITISH NORTH BORNEO, Mount Bungal, *Clemens 11200,* December 9, 1915, along trails in forests, the flowers dull yellowish-brown.

A species of the section *Sericospermum,* well characterized by its elliptic, prominently nerved and reticulate, coriaceous leaves, its rather dense ferruginous indumentum, and its short fascicled racemes.

Pygeum ellipticum, sp. nov. § *Sericospermum.*

Frutex vel arbor, partibus junioribus et inflorescentiis et foliis subtus in costa nervisque plus minusve castaneo-pubescentibus; *foliis* ellipticis, crasse coriaceis, usque ad 13 cm. longis, integris, in pagina superiore minute puncticulatis, obtusis vel obtuse acuminatis, basi late acutis vel leviter decurrento-acuminatis, glandulis ellipticis, prominentibus, nervis utrinque circiter 10, prominentibus; *racemis* axillaribus, fasciculatis, circiter 3 cm. longis; *calycis* lobis 10; *ovario* dense pubescente.

A shrub or tree, the young branchlets, inflorescence, and the lower surface of the leaves on the midrib and to a less degree on the nerves rather prominently pubescent with dark-brown or castaneous hairs, the branches glabrous, terete, lenticellate, dark-brown. Leaves thickly coriaceous, elliptic, 11 to 13 cm. long, 7 to 9 cm. wide, entire, apex obtuse or obtusely acuminate, base broadly acute or somewhat decurrent-acuminate, the glands prominent, elliptic, slightly raised on the upper surface, the upper surface olivaceous, shining, the midrib usually pubescent, the lower surface brownish; lateral nerves about 10 on each side of the midrib, very prominent, spreading, slightly curved, the reticulations lax; petioles stout, pubescent, 1 to 1.8 cm. long. Racemes axillary, fascicled, about 3 cm. long, the pedicels about 1 mm. long, the bracteoles elliptic-ovate, obtuse, nearly 2 mm. long, pubescent. Calyx-tube about 2 mm. long, obconic, 2 mm. in diameter at the base, nearly twice as wide at the throat, pubescent, the lobes 10, narrowly oblong, densely villous, about 1.5 mm. long. Stamens about 25, 2 to 5 mm. long. Ovary ovoid, densely villous; style 4 mm. long, glabrous or with few scattered hairs.

SARAWAK, Mount Poë collected by *Jee Koo,* July, 1908, received from the Sarawak Museum.

In some respects similar to *Pygeum pachyphyllum,* Merr., but with much longer racemes, more numerous calyx-lobes, quite different indumentum, the base of the leaves very different in shape and prominently glandular, and the upper surface with numerous, scattered, minute pits.

CONNARACEAE.

Ellipanthus, Hooker f.

Ellipanthus mindanaensis, Merr. in Philip. Journ. Sci. **4** (1909) Bot. 124.

BRITISH NORTH BORNEO, Kalambakan, *Villamil 256,* September 21, 1916, in forests along streams near sea level.

While this specimen is not directly comparible with *Ellipanthus mindanaensis,* Merr., the type of the latter being a fruiting specimens and the Bornean plant being in flower manifestly but a single species is represented by the two. The Bornean plant has somewhat thinner leaves than the Mindanao one, and the ultimate reticulations are not as conspicuous. The species is well characterized by its distinctly peltate leaves, the petioles being inserted from 1 to 2 mm. above the basal margin.

LEGUMINOSAE.

Parkia, R. Brown.

Parkia singularis, Miq., Fl. Ind. Bat. **1** (1858) 1078; Suppl. (1862) 285.

BRITISH NORTH BORNEO, Sandakan, *Villamil* 201, January 8, 1916; altitude about 100 meters.

The specimens agree closely with Miquel's extended description as given in his supplementary volume on Sumatra. The pinnae are 2-jugate, and the leaflets, somewhat smaller than described by Miquel, are pale beneath. The species has previously been reported only from Sumatra, and is distinguished among all the species of *Parkia* by its large leaflets.

Mezoneurum, Desfontaines.

Mezoneurum sumatranum, (Roxb.) W. & A., Prodr. (1834) 283.

Caesalpinia sumatrana, Roxb. Hort. Beng. (1814) 32, *nomen nudum;* Fl. Ind. ed. 2, **2** (1832) 366.

BRITISH NORTH BORNEO, Sandakan, *Villamil 190,* March 20, 1913, borders of swamps near the Wireless Station.

New to Borneo; Malay Peninsula, Sumatra, and southern Palawan.

Pahudia, Miquel.

Pahudia borneensis, (Harms), comb. nov.

Afzelia borneensis, Harms in Fedde, Repert. **14** (1916) 256 (April 15).

Pahudia acuminata, Merr. in Philip. Journ. Sci. **11** (1916) Bot. 86 (June 24).

The type of both *Afzelia borneensis,* Harms, and *Pahudia acuminata,* Merr., is *Hose 93,* and Harms's specific name has priority. The number of Fedde's Repertorium containing the description of *Afzelia borneensis,* Harms, did not reach Manila until November 20, 1916. Dr. Harms does not consider that the Malayan *Pahudia,* Miquel, is generically distinct from the African *Afzelia,* Smith, in which he may be correct, but in this connection *Afzelia,* Smith (1798), is entirely different from *Afzelia,* Gmel. (1791), and I prefer to retain Miquel's generic name *Pahudia.*

Desmodium, Desvaux.

Desmodium laxum, DC. in Ann. Sci. Nat. **4** (1825) 336.

British North Borneo, Mount Kinabalu, Marai Parai Spur, *Clemens 10901,* November 24, 1915.

India to southern China, the Philippines, and Malaya.

Uraria, Desfontaines.

Uraria picta, (Jacq.) Desv., Journ. Bot **1** (1913) 123, t. 5, f. 19.

Hedysarum pictum, Jacq. Coll. **2** (1788) 262.

British North Borneo, Khota Balud to Kibayo, *Clemens 9785, Topping 1483,* October 28, 1916.

Widely distributed in the tropics of the Old World, introduced into the New World, but not previously recorded from Borneo.

Mucuna, Adanson.

Mucuna toppingii, sp. nov. § *Zoophthalmum, Carpopogon.*

Frutex alte scandens, foliolis subtus parce hirsutis, inflorescentiis dense ferrugineo-pubescentibus et pilis rigidis fuscis instructis; *foliolis* ovatis vel elliptico-ovatis, acuminatis, usque ad 15 cm. longis, basi rotundatis, nervis utrinque circiter 6; *inflorescentiis* racemosis; *racemis* axillaribus, solitariis vel fasciculatis, usque ad 20 cm. longis; *floribus* atro-purpureis, circiter 4 cm. longis, *calyce* obliquo, pilis rigidis instructo; *carina* cartilagineo-acuminata; *leguminibus* junioribus oblongis, dense ferrugineo-pubescentibus et pilis rigidis fuscis numerosissimis instructis, suturis alatis, valvis planis, haud transverse lamellatis.

A more or less woody, luxuriant vine, the branches terete, brownish, striate, glabrous, sparingly lenticellate. Petioles 8 to 12 cm. long, glabrous, or when young sparingly hirsute; stipels acicular, about 3 mm. long; leaflets ovate to elliptic-ovate, the terminal one equilateral, the others more or less inequilateral, olivaceous, shining, chartaceous, 12 to 15 cm. long, 7.5 to 9.5 cm. wide, base rounded or very shallowly cordate, apex rather prominently acuminate, the lower surface sparingly hirsute on the midrib and lateral nerves, the upper glabrous; lateral nerves about 6 on each side of the midrib, prominent, curved-ascending; petiolules 5 to 7 mm. long. Racemes axillary, solitary or fascicled, slender, up to 20 cm. in length, sometimes with one or two branches forming a depauperate panicle, 1 to 4 in each axil, rather densely ferruginous-pubescent and with long, stiff, scattered hairs intermixed, the nodes prominently thickened. Flowers dark-purple, about 4 cm. long, their pedicels densely ferruginous-pubescent, up to 1.5 cm. long, each with a pair of orbicular-ovate, rounded, 4 to 5 mm. long, deciduous bracteoles at the apex. Calyx in bud somewhat cup-shaped, in anthesis broad, oblique, up to 1.4 cm. wide, the upper lobe distinct in bud, nearly obsolete in anthesis, the two lateral ones inequilateral, ovate, rounded, about 2 mm. long, the lower one oblong to triangular-ovate, obtuse, about 5 mm. long, outside densely ferruginous-pubescent and supplied with numerous long, stiff, brown, stinging hairs. Standard glabrous, orbicular, 2.5 cm. in diameter, rounded, base shallowly cordate, the claw stout, short, about 2 mm. long, twice as wide. Wings oblong, 4 cm. long, 1.4 cm. wide, rounded, the claw 4 to 5 mm. long, the basal auricle ovate, rounded, 3 mm. long, the back and margins in the lower 10 to 12 mm. pubescent, otherwise glabrous. Keel about as long as the wings, about 6 mm. wide, glabrous, somewhat curved-falcate above, the tip cartilaginous, acuminate, the claw about 6 mm. long, the auricle ovate, rounded, about 2 mm. long. Ovary oblong, densely covered with stiff, ferruginous, stinging, appressed hairs; style hirsute. Young pods oblong, flattened, about 7 cm. long and 3 cm. wide, densely ferruginous-pubescent, and supplied with very numerous stiff, ferruginous, stinging hairs 2 to 3 mm. in length, the sutures narrowly winged throughout their length, the valves flat, plain, with no transverse plaits.

BRITISH NORTH BORNEO, Mount Kinabalu, Kiau, *Clemens 10085* (type), *10049*, November, 1915, *Topping 1561,* November 2, 1915, in thickets, altitude about 1450 meters.

A very characteristic species manifestly belonging in the group with *Mucuna acuminata,* Grah., but with an entirely different inflorescence. In its vegetative characters it approaches *Mucuna biplicata,* T. & B., but belongs to quite another section of the genus, the valves having no transverse plaits.

RUTACEAE.

Tetractomia, Hooker f.

Tetractomia obovata, sp. nov.

Frutex usque ad 2 m. altus, glaber, vel inflorescentiis parcissime pubescens; *foliis* coriaceis, obovatis, usque ad

9 cm. longis, olivaceis, nitidis, apice rotundatis vel retusis, basi cuneatis, nervis utrinque circiter 10, distinctis; *inflorescentiis* axillaribus, pedunculatis, usque ad 5 cm. longis, paucifloris; *floribus* circiter 1 cm. diametro; *petalis* ovatis, acutis, 4 mm. longis; *fructibus* 4 mm. longis.

A shrub 2 m. high or less, quite glabrous or the florescence, sparingly pubescent on its younger parts. Branches and branchlets terete, stout, the former brownish-gray, the latter nearly black when dry, the petiolar scars rather prominent. Leaves coriaceous, dark-olivaceous when dry, somewhat shining, 5.5 to 9 cm. long, 4 to 6 cm. wide, apex broadly rounded, sometimes retuse, base narrowed, cuneate, the lower surface paler than the upper, with very numerous, small, brownish glands; lateral nerves about 10 on each side of the midrib, slender but rather prominent, obscurely anastomosing; petioles rather stout, 1 to 1.4 cm. long. Cymes axillary, up to 5 cm. long, peduncled, few-flowered, the pedicels 4 mm. long, the bracteoles broadly ovate, thick, about 1 mm. long. Flowers 4-merous, about 1 cm. in diameter. Calyx nearly square in outline, 3 mm. wide, the lobes short, rounded to acute, thick, concave. Petals ovate, punctate, 4 mm. long, 3 mm. wide, acute, persistent. Fertile stamens 4, opposite the sepals, their filaments 4 mm. long, with four alternating, sterile, 2 mm. long filaments opposite and attached to the base of the petals. Disk prominent. Ovary depressed, sunk in the disk, the top broadly pyramidal and obscurely 4-lobed; style 3 mm. long. Fruit composed of four, erect, free or nearly free, oblong, thickly coriaceous, 6 mm. long cocci.

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Clemens 11025,* December 1, 1915, growing in open places, the flowers green or greenish.

A characteristic representative of this small genus, readily distinguished by its rather large flowers. It is apparently most closely allied to *Tetractomia tetrandra* (Roxb.) (*Melicope tetrandra,* Roxb., *Tetractomia roxburghii,* Hook. f.) of the Malay Peninsula.

MELIACEAE.

Aglaia, Loureiro.

Aglaia borneensis, sp. nov. § *Hearnia.*

Arbor parva, circiter 4 m. alta, ramulis et petiolis et inflorescentiis densissime minuteque stellato-tomentosis, indumento brunneo; *foliis* circiter 1 m. longis, foliolis circiter 31, alternis, longe petiolulatis, oblongis, basi inaequilateralibus, rotundatis vel superioribus acutis, apice perspicue acuminatis, usque ad 22 cm. longis et 7 cm. latis, nervis utrinque circiter 20, supra impressis, subtus prominentibus, subtus plus minusve minuteque stellato-lepidotis; *inflorescentiis* axillaribus, pyramidato-paniculatis, usque ad 45 cm. longis, breviter pedunculatis, ramis inferioribus circiter 16 cm. longis, multifloris; *floribus* 5-meris, breviter pedicellatis; *calyce* extus minute stellato-tomentoso; *petalis* liberis, glabris, 1 mm. longis, tubo turbinato, glabro.

A small tree about 4 m. high the trunk about 10 cm. in diameter, the branches, petioles, rachises and inflorescences densely and minutely stellate-lepidote, the indumentum brown. Ultimate branches terete, about 1 cm. in diameter. Leaves alternate, scattered, about 1 m. long; leaflets about 31, alternate, chartaceous, oblong, 13 to 22 cm. long, 4 to 7 cm. wide, base somewhat inequilateral, broadly rounded, or the uppermost ones acute at the base, apex prominently acuminate, the acumen usually acute, sometimes blunt, pale or olivaceous when dry, the upper surface glabrous, shining, the lower densely and minutely fuscous stellate-puberulent on the midrib, and to a less degree on the lateral nerves, with widely scattered stellate scales on the surface; lateral nerves about 20 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, somewhat spreading, curved, anastomosing; petiolules densely brown-lepidote-puberulent, 1 to 1.5 cm. long. Panicles axillary, solitary, pyramidal, up to 45 cm. long, the lower branches up to 16 cm. in length. Flowers very numerous, 5-merous, yellowish-green, rather laxly disposed on the ultimate branchlets, their pedicels about 0.5 mm. long, densely stellate-puberulent. Calyx-lobes 5, broadly triangular, 0.3 mm. long or less, obtuse. Petals 5, obovate to obovate-elliptic, glabrous, 1 mm. long. Staminal-tube turbinate, free, glabrous, 0.5 mm. long, margins crenate, anthers usually 5, sometimes 4, inserted at the margin of the tube between the crenulations.

BRITISH NORTH BORNEO, Silimpopon, *Villamil 247,* September 1, 1916, in flat moist regions, altitude about 50 meters.

Among those species of *Hearnia* previously described this comes closest to *Hearnia beccariana,* C. DC. = *Aglaia beccariana,* Harms, from which it is at once distinguished by its much longer leaves, its much larger leaflets and its uniformly dense, brown, stellate-puberulent indumentum on the branches. petioles, rachises, petiolules, midribs on the lower surface of the leaves, and inflorescences.

Aglaia tripetala, sp. nov. § *Euaglaia.*

Arbor circiter 30 m. alta, ramulis junioribus inflorescentiisque plus minusve lepidotis, deinde ramis glabrescentibus; *foliis* 30 ad 40 cm. longis, alternis, foliolis 7 vel 9, oppositis, oblongis, obtusis, leviter falcatis, basi valde inaequilateralibus, usque ad 13 cm. longis, nervis utrinque circiter 12, tenuibus; *inflorescentiis* axillaribus, folia subaequantibus, ramis primariis

paucis, patulis, inferioribus usque ad 12 cm. longis; *floribus* 3-meris. pedicellatis in ramulis ultimis subracemose dispositis; *calyci* lepidoto, leviter 3-lobato; *petalis* 3, ellipticis, concavis, 3 mm. longis, liberis; *staminibus* 6, inclusis.

A tree about 30 m. high according to the collector, quite glabrous except the young branchlets and the inflorescence. Branches terete, dark-brown, the ultimate ones about 5 mm. in diameter, glabrous, the tips of the ultimate branchlets densely lepidote. Leaves alternate, 30 to 40 cm. long, entirely glabrous; leaflets 7 or 9, opposite, pale-olivaceous when dry, somewhat falcate, rather tough in texture, base strongly inequilateral, one side broadly rounded and extending about 5 mm. along the midrib below the narrower acute side; lateral nerves slender, about 12 on each side of the midrib; petiolules 5 to 7 mm. long. Panicles axillary, about as long as the leaves, the older parts glabrous, the younger parts with scattered, pale, lepidote scales, the primary branches few, scattered, the lower ones up to 12 cm. in length. Flowers 3-merous, greenish-yellow, comparatively large, cymosely and rather laxly disposed on the ultimate branchlets, their pedicels 1 to 2 mm. long. Calyx rather densely lepidote, about 2 mm. in diameter, with three, broad, rounded, shallow lobes. Petals 3, entirely free, glabrous, elliptic, concave, rounded, 3 mm. long. Staminal-tube somewhat obovoid or obconic, about 2.8 mm. long, glabrous, with three broad very shallow lobes. Stamens 6, included, about 1.2 mm. long. Rudimentary ovary glabrous, about 1 mm. long, often 3-lobed.

British North Borneo, Sandakan, *Villamil 184,* March 16, 1913, back of a swamp beyond the Wireless Station.

A species well characterized by its comparatively large, 3-merous flowers, its glabrous leaves, elongated, sparingly lepidote inflorescences, and its very strongly inequilateral leaflets. It is perhaps most closely allied to *Aglaia laxiflora,* Miq.

EUPHORBIACEAE.

Antidesma, Linnaeus.

Antidesma cauliflorum, sp. nov.

Arbor circiter 5 m. alta, ramulis junioribus et petiolis et foliis subtus in costa nervisque et inflorescentiis prominente subferrugineo-pubescentibus; *foliis* oblongis, usque ad 17 cm. longis, chartaceis, nitidis, acute acuminatis, basi obtusis vel rotundatis, nervis utrinque 7 ad 10, curvato-adseendentibus, prominentibus; stipulis lineari-lanceolatis, acuminatis, circiter 1 cm. longis, leviter falcatis, deciduis; *inflorescentiis* ex truncis et ramis vetustioribus, usque ad 15 cm. longis, depauperato paniculatis; *racemis* paucis, elongatis; *pedicellis* 1.5 ad 2 mm. longis, quam bracteolis duplo longioribus; *floribus* 5-

meris; *fructibus* rubris, ovoideis vel ellipsoideis, turgidis, inaequilateralibus, leviter carinatis, grosse rugoso-reticulatis, circiter 7 mm. longis, stigmate terminali.

A tree about 5 m. high, the branchlets, petioles, lower surface of the leaves on the costa and nerves and the inflorescences prominently pubescent with subferruginous hairs. Older branches grayish, terete, glabrous. Leaves chartaceous, subolivaceous, shining, oblong, 12 to 17 cm. long, 3.5 to 5.5 cm. wide, base obtuse to somewhat rounded, apex prominently acuminate, the acumen acute or sometimes apiculate, the upper surface slightly puncticulate, glabrous, or the midrib slightly pubescent; lateral nerves 7 to 10 on each side of the midrib, curved-ascending, rather obscurely anastomosing, prominent; petioles densely pubescent, 5 to 8 mm. long; stipules linear-lanceolate, somewhat falcate, acuminate, pubescent, about 1 cm. long, deciduous. Inflorescences from the older branches and from tubercles on the trunk, up to 15 cm. long, ferruginous-pubescent, each with usually two elongated branches; pistillate flowers pedicelled, 5-merous, the calyx divided about one-half to the base, the lobes oblong-ovate, acute, pubescent, about 0.6 mm. long; pedicels pubescent, in fruit 1.5 to 2 mm. long, about twice as long as the inconspicuous, pubescent bracteoles. Fruits glabrous, red, ovoid to ellipsoid, inequilateral, turgid, slightly carinate, very coarsely and conspicuously rugose-reticulate, acute, about 7 mm. long, the stigma apical.

British North Borneo, Mount Kinabalu, Gurulau Spur and Kiau, *Clemens 10790* (type), *9944*, November, 1915.

A species readily distinguished by its cauline inflorescence. In vegetative characters it approaches *Antidesma montanum*, Blume, and *A. moritzii*, Muell.-Arg., and its alliance is probably with these species, which, however, have terminal inflorescences.

Antidesma clementis, sp. nov.

Frutex vel arbor parva, ramulis et petiolis et infructescentibus plus minusve pubescentibus; *foliis* oblongo-lanceolatis, subcoriaceis, olivaceis, nitidis, usque ad 9 cm. longis, tenuiter acuminatis, basi acutis, nitidis, nervis utrinque circiter 7, prominentibus; stipulis acicularibus, pubescentibus, circiter 8 mm. longis; spicis axillaribus, solitariis, circiter 4 cm. longis; *floribus* ♀ 5-meris, sessilibus; *fructibus* oblongo-ovatis, compressis, 1 cm. longis, inaequilateralibus, basi rotundatis, apice acutis, extus leviter strigilloso-hirsutis, laxe reticulatis, stigmate terminali.

A shrub or small tree, the branchlets, petioles and spikes more or less pubescent, the branchlets densely so, the indumentum dirty brown. Leaves oblong-lanceolate, subcoriaceous, olivaceous and shining when dry, 6 to 9 cm. long, 2.5 to 3 cm. wide, apex slenderly acuminate, the acumen blunt or acute, often apiculate, base acute, the upper surface entirely glabrous, the lower sparingly pubescent on the midrib and lateral nerves; lateral nerves about 7 on each side of the midrib, prominent, anastomosing; petioles about 2 mm. long; stipules acicular, about 8 mm. long, acuminate, pubescent. Spikes solitary, simple, from the lower axils, up to 4 cm. long. Pistillate flowers sessile, 5-merous, the disk-like central part of the calyx thick, about 1.2 mm. in diameter, the lobes membranaceous, pubescent, 0.5 mm. long; bracteoles not seen. Fruits red, oblong-ovate, compressed, 1 cm. long, 5 mm. wide, base rounded, apex acute, sparingly strigillose-hirsute externally, laxly reticulate, dark-brown when dry, shining; the stigma terminal.

BRITISH NORTH BORNEO, Mount Kinabalu, Lobang, *Clemens 10374,* November 11, 1915.

A species well characterized by its lanceolate or oblong-lanceolate, prominently acuminate, rather few-nerved leaves, its narrow stipules, and its large, compressed, sessile fruits. In vegetative characters it resembles *Antidesma stenophyllum,* Merr., differing in its much smaller, fewer-nerved leaves. From *Antidesma gibbsiae,* Hutchinson, the type of which was from Tenom, and which has sessile 1 cm. long fruits and subulate stipules, it differs in the same characters as from *A. stenophyllum,* Merr.

Antidesma inflatum, sp. nov.

Arbor circiter 5 m. alta, praeter inflorescentias dense rubiginoso-pubescentes glabra; *foliis* subcoriaceis, nitidis, subolivaceis, oblongo-ellipticis, usque ad 18 cm. longis, basi acutis, apice abrupte obtuseque acuminatis, nervis utrinque 8 vel 9, subtus prominentibus; stipulis coriaceis, ovatis vel oblongo-ovatis, obtusis vel acuminatis, 5- ad 7-nerviis, 10 ad 12 mm. longis, persistentibus; *inflorescentiis* ♀ terminalibus simplicibus, racemosis, usque ad 12 cm. longis, basi bracteis prominentibus instructis; *floribus* 5-meris, calycis lobis brevibus, pubescentibus; *fructibus* valde inflatis, circiter 9 mm. longis, inaequilateralibus, reticulatis, glabris, apice rotundatis, stigmate distincte laterali.

A tree about 5 m. high, entirely glabrous except the densely rubiginous-pubescent inflorescence. Branches slender, terete, smooth, brownish-olivaceous. Leaves subcoriaceous, oblong-elliptic, subolivaceous, of nearly the same color on both surfaces, shining, 12 to 18 cm. long, 5 to 8 cm. wide, base acute, apex abruptly and obtusely acuminate; lateral nerves 8 or 9 on each side of the midrib, prominent on the lower surface, anastomosing, the primary reticulations lax; petioles 5 to 8 mm. long; stipules persistent, coriaceous, inequilateral, ovate to oblong-ovate, obtuse to acuminate, 10 to 12 mm. long, 6 to 8 mm. wide, 5- to 7-nerved. Fruiting racemes terminal, solitary, simple, up to 12 cm. long, the basal part of the peduncle with several pairs of conspicuous, oblong-lanceolate, acuminate, pubescent, 5 to 7 mm. long bracts; pedicels pubescent, 4 to 5 mm. long; bracteoles inconspicuous. Calyx about 2 mm. in diameter, pubescent, the lobes triangular, acute, about 0.5 mm. long. Disk very prominent, glabrous, thick, as wide as the calyx in fruit. Fruits 9 mm. long, strongly inflated, ovoid, inequilateral, rounded at both ends, red, glabrous, slightly keeled, prominently reticulate, the stigma distinctly lateral, situated at about 2 mm. below the rounded apex of the fruit.

British North Borneo, Kalabakan watershed, *Villamil 235,* October 6, 1916, along the margins of swamps at sealevel.

A rather strongly marked species, in vegetative characters somewhat resembling *Antidesma stipulare,* Blume, but radically different in its fruit characters. It is readily distinguishable by its rubiginous-pubescent racemes, the plant otherwise entirely glabrous, and its strongly inflated fruits which are rounded at both ends, the stigmas distinctly lateral, not terminal.

Sauropus, Blume.

Sauropus androgyna, (Linn.) Merr. in Forestry Bur. (Philip.) Bull. **1** (1903) 30.

Cluytia androgyna, Linn. Mant. **1** (1767) 128.

Sauropus albicans, Blume, Bijdr. (1825) 596.

British North Borneo, Jesselton, *Topping 1934,* December 4, 1916.

India to China southward to Java and the Moluccas.

Ostodes, Blume.

Ostodes villamilii, sp. nov. § *Desmostemon.*

Arbor, partibus junioribus exceptis glabra; *foliis* subcoriaceis, integris, oblongis vel elliptico-oblongis, usque ad 16 cm. longis, basi acutis, vix glandulosis, apice acutis vel obtusis, nervis utrinque 8 ad 10, subtus prominentibus; inflorescentiis axillaribus, paniculatis, usque ad 12 cm. longis; *floribus* ♂ numerosis, calyci irregulariter 3-fisso, lobis integris vel 2-lobatis; petalis oblongo-ellipticis, integris, obtusis, circiter 4.5 mm. longis, intus villosis; *staminibus* circiter 7, filamentis brevibus, pilosis.

A tree, according to the collector about 30 m. high, dioecious, the inner bark yellowish, with the odor of *Jatropha curcas,* the twigs yielding a reddish sap. Branches terete, grayish, glabrous, the branchlets appressed-pubescent with short pale hairs. Leaves subcoriaceous, entire, oblong to oblong-elliptic, 9 to 16 cm. long, 4 to 6 cm. wide, subequally narrowed to the acute, scarcely glandular base and to the acute or blunt apex; lateral nerves 8 to 10 on each side of the midrib, prominent on both surfaces, curved, anastomosing, the reticulations prominent; petioles 1.5 to 4 cm. long. Staminate inflorescences axillary, solitary, paniculate, up to 12 cm. in length, glabrous or nearly so, branched from near the base, the branches few, distant, spreading, the lower ones up to 4 cm. in length, the flowers white, cymosely disposed on the branchlets, their pedicels up to 5 mm. long. Calyx about 4 mm. long, rather irregularly splitting into three oblong-ovate lobes which extend nearly to the base, two of the lobes cleft at the apex, somewhat contracted above and bearing two thin, suborbicular lobules about 1 mm. in diameter, the third lobe with a single terminal lobule. Petals 5, free, oblong-elliptic, obtuse, entire, about 4.5 mm. long, rather densely villous with pale hairs on the inner surface below. Disk glands prominent, glabrous, up to 1 mm. in length. Stamens usually 7, their filaments slightly united, pale-villous, up to two mm. in length. Rudimentary ovary none. Pistillate flowers and fruits unknown.

British North Borneo, Sandakan, *Villamil 164,* February 27, 1916, in forests, altitude about 90 meters.

A characteristis species apparently not closely allied to any previously described form. It is somewhat anomalous in the genus *Ostodes* in its few stamens, in this character aproaching *Ostodes minor,* Muell.-Arg. The orbicular terminal appendages of the calyx lobes are characteristic, these corresponding to the petals in number, arranged on the irregular lobes, two lobes bearing two each, the third a single one.

CELASTRACEAE.

Elaeodendron, Jacquin.

Elaeodendron subrotundum, King in Journ. As. Soc. Beng. 65^2 (1896) 356.

Sarawak, Lundu, *Foxworthy 119,* May 18, 1908, in swamps at the mouth of the river; known to the Dyaks as *galan.* British North Borneo, Segalind River, *Foxworthy 623,* in mangrove swamps, locally known as *landing-landing.*

Malay Peninsula and the Andaman Islands.

The Bornean material perfectly matches *Ridley 12481* from Johore. The minute appressed teeth on the leaf-margins are not mentioned by King in the original description of the species.

VITACEAE.

Ampelocissus, Planchon.

Ampelocissus pedicellata, sp. nov. § *Kalocissus.*

Frutex scandens partibus junioribus et inflorescentiis et petiolis et petiolulis et foliorum laminis costa nervisque ferrugineo-arachnoideo-villosis; *foliis* palmato-pedato-7-foliolatis, foliolis oblongis, coriaceis, usque ad 20 cm. longis, tenuiter acuminatis, basi plus minusve inaequilateralibus, acutis, vel acuminatis, margine distanter spinuloso-denticulatis vel integris, nervis utrinque circiter 9; *inflorescentiis* ut videtur longe pedunculatis, *racemis* numerosis, confertis, 2.4 ad 3.5 cm. longis, racemose dispositis; *floribus* glabris, 4-meris, omnibus breviter pedicellatis; *petalis* 2 ad 2.5 mm. longis, oblongis.

A scandent shrub, the younger parts, inflorescences, petioles, petiolules, and the midrib and nerves on both surfaces of the leaves densely villous with cobweb-like ferruginous hairs, these in age often pale in color. Leaves apparently long-petioled, the leaflets 7, the three middle ones with petiolules 2.5 to 3.5 cm. in length, the two lateral ones on each side on a common branch about as long as the central petiolules, their petiolules 5 to 10 mm. long, the leaflets coriaceous, dark-brown or nearly black when dry, oblong, 15 to 20 cm. long, 5.5 to 8 cm. wide, base acute or acuminate, usually more or less inequilateral, apex slenderly and sharply acuminate, margins distantly spinulose-dentate by the excurrent lateral nerves, or subentire; lateral nerves about 9 on each side of the midrib, very prominent on the lower surface as are the primary reticulations. Inflorescences apparently long-peduncled, the upper 15 cm. bearing numerous, spreading-ascending, 2.5 to 3.5 cm. long racemes, the common rachis and those of the racemes densely ferruginous-lanate. Flowers numerous, entirely glabrous, their pedicels 1.5 to 2 mm. long. Calyx about 1 mm. in diameter, the lobes four, rounded, obscure. Petals 4, oblong, obtuse or acute, 2 to 2.5 mm. long. Ovary glabrous, somewhat ellipsoid, the style about 0.6 mm. long.

SARAWAK, without definite locality, *Native collector 247* (Bur. Sci.).

A most characteristic species at once distinguished from all described forms by its pedicelled flowers. It is suspected that it is the same as the form indicated by Planchon in DC. Monog. Phan. **5** (1887) 414 as "A. sp. nova. Borneo (Beccari, no. 178, in herb. Kew)," but not described by him.

Ampelocissus tenuis, sp. nov. § *Kalocissus.*

Scandens, tenuis, ramulis circiter 1 mm. crassis, partibus junioribus et petiolis et inflorescentiis et foliolis subtus in costa nervisque dense rufo-lanatis; *foliis* pedato-palmato-5-foliolatis,

petiolulis interioribus 1-foliolatis, lateralibus 2-foliolatis, foliolis membranaceis, oblongo-ellipticis vel oblongis, usque ad 6 cm. longis, apice acuminatis apiculatisque, basi acutis, margine leviter undulatis, distanter spinuloso-denticulatis, nervis utrinque 5 vel 6; *inflorescentiis* longe tenuiterque pedunculatis, spicis circiter 15, circiter 1 cm. longis, patulis; *floribus* parvis, 4-meris, petalis junioribus circiter 1 mm. longis.

A very slender, scandent plant, the branches, branchlets, inflorescences, petioles petiolules and the midrib and nerves on the lower surface of the leaves densely rusty or rubiginous-lanate, the branches very slender, about 1 mm. in diameter. Leaves palmate-pedate 5-foliolate, their petioles slender, 2 to 3 cm. long, the stipules ovate to oblong-ovate, slightly pubescent, about 3 mm. long. Leaflets membranaceous, oblong-elliptic to oblong, brownish when dry, the upper surface quite glabrous, 2 to 6 cm. long, 1 to 2.5 cm. wide, the central ones larger than the lateral, the interior on a 3 to 4 mm. long, petiolule, the two lateral ones on each side subsessile on 4 to 6 mm. long, branchlets of the common petiole, the central leaflet equilateral, the others inequilateral, apex acuminate and apiculate, base usually acute, margins distantly spinulose-denticulate by the excurrent lateral nerves, slightly undulate; lateral nerves 5 or 6, slender, densely brown-tomentose on the lower surface. Inflorescences on a very slender peduncle which attains a length of at least 10 cm., 1 mm. in diameter or less, composed of about 15, slender, spreading, 1 cm. long spikes arranged in the upper 5 cm. of the inflorescence, the peduncle and common rachis densely rubiginous-villous, the rachises of the spikes minutely grayish-pubescent or puberulent. Flowers small, 12 to 20 on each spike, 4- rarely 5-merous, sessile, their bracteoles ovate-lanceolate, acuminate, 0.5 mm. long. Calyx cup-shaped, glabrous, 0.8 mm. long, with very obscure, broadly rounded lobes. Petals 4, rarely 5, in bud oblong-elliptic, about 1 mm. long. Anthers oblong. Ovary glabrous.

SARAWAK, without definite locality, *Native collector 251* (Bur. Sci.).

A characteristic species, readily recognizable by its very slender stems, its small, membranaceous leaflets which are glabrous on the upper surface and rubiginous-pubescent on the nerves and midrib beneath, and by its very slender, small, inflorescences. Its alliance is apparently with *Ampelocissus motleyi*, Planch.

Pterisanthes, Blume.

Pterisanthes parvifolia, sp. nov.

Frutex scandens, tenuis, glaber; *foliis* simplicibus, oblongis, usque ad 7 cm. longis, chartaceis, basi cordatis, apice acuminatis apiculatisque, margine distanter denticulatis, nervis utrinque 4 vel 5; *receptaculis* longe pedunculatis, oblongis, planis, usque ad 8 cm. longis et 2 cm. latis, basi attenuatis; *floribus* marginalibus utrinque 2 vel 3, longissime pedicellatis; hermaphroditis numerosis, utrinque in laminibus inflorescentiae immersis.

A slender, scandent, glabrous plant, the branches terete, 1 to 2 mm. in diameter. Leaves oblong, chartaceous, rather pale when dry, glabrous, somewhat shining, 6 to 7 cm. long, 3 to 3.5 cm. wide, base somewhat cordate, apex acuminate and apiculate, margins with few, usually about three, glandular teeth; lateral nerves 3 or 4 on each side of the midrib, slender, anastomosing, the reticulations rather lax, distinct; petioles 1 to 1.5 cm. long. Special branch bearing the peduncle opposite the leaves, 2 to 4 cm. long, the tendril 4 to 5 cm. long, the peduncle slender, attaining a length of 12 cm. Inflorescence in general oblong, flat, dark-brown when dry, up to 8 cm. long and 2 cm. wide, base attenuate, flat, two-winged, the marginal staminate flowers two or three on each side, their pedicels up to 2 cm. in length, the perfect flowers numerous, scattered over both surfaces of the wings, immersed, in anthesis 2 to 2.5 mm. in diameter, the buds about 1.5 mm. in diameter.

SARAWAK, Baram District, Marudi, *Hose 213,* October 26, 1894.

A species well characterized by its small leaves, and its few, long-pedicelled, marginal flowers. Its alliance is with *Pterisanthes polita,* Miq.

ELAEOCARPACEAE.

Elaeocarpus, Linnaeus.

Elaeocarpus longipetiolatus, sp. nov. § *Ganitrus.*

Arbor circiter 9 m. alta partibus junioribus et foliis subtus ad costa nervisque et inflorescentiis adpresse pubescentibus; *foliis* longe petiolatis (petiolo 3 ad 6 cm. longo), oblongo-ovatis ad oblongo-ellipticis, usque ad 15 cm. longis, prominente acuminatis, basi subacutis, crenulatis, subtus glandulis minutis brunneis inspersis, nervis utrinque 7 vel 8, subtus prominentibus; racemis solitariis, ex axillis defoliatis, circiter 10 cm. longis; *floribus* 5-meris, 6 mm. longis; *sepalis* extus adpresse pubescentibus; *petalis* margine excepto leviter pubescentibus glabris, usque ad mediam partem fissis, segmentis circiter 24, tenuibus; *staminibus* circiter 30, valvis obtusis, longioribus minute barbatis; *ovario* 5-loculare.

A tree about 9 m. high the younger parts, midrib and lateral nerves on the lower surface of the leaves, and the inflorescence with appressed pale-brownish pubescence. Branches terete, dark-colored, glabrous, above somewhat puberulent, the branchlets densely pubescent. Leaves scattered, oblong-ovate to oblong-elliptic, firmly chartaceous, 10 to 15 cm. long, 5 to 7 cm. wide, the upper surface brownish, glabrous, somewhat shining, the lower paler, softly pubescent on the midrib and lateral nerves, and with scattered, minute, brownish glands over the entire surface, base subacute, apex prominently acuminate, acumen 1 to 1.5 cm. long, blunt, margins crenate, the teeth usually supplied with a short appressed mucro; lateral nerves 7 or 8 on each side of the midrib, prominent, somewhat curved, anastomosing, the reticulations rather lax, distinct; petioles 3 to 6 cm. long, when young densely pubescent, ultimately glabrous; stipules linear, acuminate, about 5 mm. long, densely pubescent except the glabrous, black, mucronate tip, usually with a small lateral lobe from near the base. Racemes about 10 cm. long, solitary from the axils of fallen leaves, pubescent, about 30-flowered, flowers greenish-yellow and white, 5-merous, scattered, ebracteolate, their pedicels slender, about 7 mm. long. Sepals lanceolate, somewhat acuminate, 5 mm. long, 1.8 mm. wide, externally uniformly but not densely appressed-pubescent. Petals in outline obovate-cuneate, 6 mm. long, glabrous except the minutely pubescent margins in the lower part, the upper one-half cut into about 24 filiform fimbriae which are arranged in phalanges of three each, gradually narrowed to the cuneate base. Stamens about 30, their filaments 1 to 1.2 mm. long; anthers oblong, scabrid, 1.2 mm. long, the cells obtuse, one slightly exceeding the other and minutely ciliate, the ciliae usually 3, short, obscure. Disk glands five, globose, prominent, pubescent. Ovary ovoid, pubescent, 5-celled; style thickened below, about 2.5 mm. long. Fruit globose-ellipsoid, about 1.5 cm. in diameter, smooth, the endocarp very hard, smooth, 5-celled, but usually developing only three seeds.

BRITISH NORTH BORNEO, Sandakan, *Villamil 116,* January 2, 1913, in rocky soil near the Government Office, altitude about 17 meters.

A species apparently most closely allied to *Elaeocarpus stipularis,* Blume, which is placed by some authors in the section *Ganitrus,* by others in the section *Dicera.* It differs, however, in very many details of its vegetative characters, its stipules, and its floral characters.

TILIACEAE.

Grewia, Linnaeus.

Grewia stylocarpa, Warb., var. **longipetiolata,** var. nov.

A typo differt petiolis paullo longioribus, circiter 2 cm. longis, glandulis basilaribus glabris, haud barbatis.

BRITISH NORTH BORNEO, Kalabakan watershed, *Villamil 243*, October 8, 1916, in forests, altitude 50 meters.

Grewia stylocarpa, Warb. is a characteristic species of very wide distribution in the Philippines, and the above form comes well within its range of variation except in its longer petioles and its basal glands not being bearded. The fruits of the Bornean form are slightly larger than in most of our Philippine specimens, and regarding it Villamil writes: "fruit yellow when ripe, with a sour taste exactly like *susumbik* (i.e. *Grewia stylocarpa*) of the Philippines."

Columbia, Persoon.

Columbia borneensis, sp. nov.

Arbor circiter 10 m. alta, ramulis hirsutis atque pilis stellatis obtectis; *foliis* oblongo-ovatis, subcoriaceis, in siccitate fragilibus, pallidis, usque ad 10 cm. longis, tenuiter acuminatis, basi plus minusve inaequilateralibus, rotundatis, margine integris vel distanter denticulatis, supra costa nervisque exceptis glabris, subtus densissime minute pallide stellato-puberulis, pilis majoribus stellatis subferrugineis intermixtis, nervis lateralibus utrinque circiter 6, prominentibus, adscendentibus; *fructibus* obovoideis, 1 ad 1.5 cm. longis, brunneis, ciliato-hirsutis.

A tree about 10 m. high, the branches and branchlets terete, dark-brown, more or less hirsute with slender spreading simple hairs intermixed with much shorter stellate ones. Leaves alternate, subcoriaceous, rather pale when dry, brittle, oblong-ovate, 5 to 10 cm. long, 2.5 to 3.5 cm. wide, sharply acuminate, base more or less inequilateral, rounded, rarely somewhat cordate, one side usually about twice as broad as the other, margins entire or distantly denticulate, the upper surface glabrous except the somewhat pubescent midrib and nerves, the lower pale, very densely and minutely grayish stellate-puberulent, with larger, subferrugineous, stellate hairs intermixed, the base 3-nerved; lateral nerves above the basal pair 4 or 5, all ascending, prominent; petioles hirsute and stellate-pubescent, up to 5 mm. in length. Panicles terminal, hirsute and stellate-pubescent, the lower branches up to 6 cm. in length. Fruits obovoid, 1 to 1.5 cm. long, dark-brown when dry, ciliate-hirsute especially on the cocci, the wings nearly glabrous, apex retuse, base subacute.

BRITISH NORTH BORNEO, Khota Balud to Kibayo, trail to Mount Kinabalu, *Clemens 9786*, October 28, 1915.

The first representative of the genus reported from Borneo, characterised by its rather small, nearly entire leaves.

THYMELAEACEAE.

Wikstroemia, Endlicher.

Wikstroemia clementis, sp. nov.

Frutex usque ad 4 m. altus partibus junioribus inflorescentiisque plus minusve adpresse pubescentibus exceptis glaber; *foliis* membranaceis, oblongo-ovatis, usque ad 9 cm. longis, basi acutis, apice tenuiter acute acuminatis, nervis utrinque 7 ad 9, tenuibus, distinctis, anastomosantibus; *inflorescentiis* terminalibus axillaribusque, breviter pedunculatis, subcapitatis. 3- vel 4-floris; *floribus* circiter 1 cm. longis, extus parce pubescentibus vel subglabris; *ovario* oblongo, glabro, stigmate subsessile.

A shrub or small tree about 4 m. high, the younger parts and the inflorescence more or less appressed-pubescent with pale hairs, otherwise glabrous. Branches and branchlets slender, terete, reddish-brown. Leaves membranaceous, oblong-ovate, 6 to 9 cm. long, 2 to 4 cm. wide, base acute, apex slenderly and sharply acuminate, shining, greenish or brownish when dry; lateral nerves 7 to 9 on each side of the midrib, slender, distinct, anastomosing, the reticulations rather distinct; petioles glabrous, 3 to 4 mm. long. Inflorescences axillary and terminal, subcapitately 3- or 4-flowered, the peduncles appressed-pubescent, 3 to 7 mm. long. Flowers yellowish, the tube 1 cm. long, externally very slightly pubescent or nearly glabrous, in one form distinctly pubescent, the lobes 4, the outer two up to 3 mm. long, obtuse, oblong-ovate, the inner two elliptic, somewhat shorter than the outer ones. Anthers 8, 2-seriate, four inserted near the mouth of the tube, four inserted 2 to 3 mm. below the throat. Ovary oblong, glabrous, about 3 mm. long; style very short; stigma capitate. Disk-scales 0.5 to 1 mm. long.

British North Borneo, Mount Kinabalu, Kiau, *Clemens 9964,* November 2, 1915 (type); Lobang, *Clemens 10419,* November, 1915, a form with the perianth-tube rather prominently pubescent.

The alliance of this species is with the Philippine *Wikstroemia ovata,* Mey., from which it is distinguishable by its shorter flowers and slenderly acuminate leaves.

Wikstroemia acuminata, sp. nov.

Frutex circiter 1.5 m. altus, inflorescentiis parcissime adpresse pubescentibus exceptis glaber; *ramis* ramulisque teretibus, tenuibus, in siccitate rubro-brunneis; *foliis* lanceolatis, usque ad 15 cm. longis, chartaceis, tenuiter acute acuminatis, basi acutis, supra subolivaceis, nitidis, subtus pallidis, subalbidis, nervis primariis utrinque circiter 10, indistinctis; *inflorescentiis* axillaribus terminalibusque brevissimis, ut videtur

paucifloris; *fructibus* ovoideis, in siccitate circiter 8 mm. longis.

A shrub about 1.5 m. high, entirely glabrous except the very sparingly appressed-pubescent inflorescences. Branches and branchlets slender, terete, smooth, reddish-brown. Leaves lanceolate, 12 to 15 cm. long, 3.5 to 4 cm. wide, chartaceous, gradually narrowed from below the middle to the slenderly acuminate apex, the base acute, the upper surface subolivaceous, shining, the lower dirty white, dull; lateral nerves very indistinct, the primary ones about 10 on each side of the midrib, curved, rather more distinct on the upper than on the lower surface; petioles 3 to 4 mm. long. Inflorescences axillary and terminal, few, possibly only one-flowered, the peduncles about as long as the petioles. Flowers not seen. Fruit yellow when mature, fleshy, when dry ovoid, about 8 mm. long, nearly black in color, somewhat shining.

BRITISH NORTH BORNEO, Sandakan, *Villamil 185,* March 21, 1916, in forests beyond the Reservoir, altitude about 100 meters.

A species well characterized by its lanceolate, slenderly acuminate leaves which are whitish on the lower surface. It may be allied to *Wikstroemia ridleyi,* Gamble, which has been reported from Sandakan by Miss Gibbs, but is very different from that form as described.

Wikstroemia subcoriacea, sp. nov.

Frutex usque ad 2 m. altus, glaberrimus, ramulis junioribus leviter compressis; *foliis* oppositis, anguste oblongis, subcoriaceis, circiter 4 cm. longis, utrinque acutis, nervis utrinque circiter 5, haud prominentibus; *inflorescentiis* axillaribus terminalibusque, cernuis, pedunculatis, paucifloris; *floribus* glabris, capitato-racemose dispositis, tubo circiter 8 mm. longo; *ovario* glabro; *squamis* hypogynis linearibus, circiter 1 mm. longis.

A shrub about 2 m. high, entirely glabrous. Branches terete, usually reddish-brown, the branchlets darker in color, more or less compressed or somewhat angular, the internodes on the branchlets 1 cm. long or less. Leaves opposite, somewhat crowded toward the tips of the branchlets, narrowly oblong, about 4 cm. long, 10 to 12 mm. wide, greenish-olivaceous when dry, the lower surface sometimes somewhat glaucescent, acute at both ends, subcoriaceous; lateral nerves about 5 on each side of the midrib, not prominent, obscurely anastomosing; petioles 2 to 3 mm. long. Inflorescences axillary and terminal, their peduncles less than 1 cm. long, cernuous, stiff, persistent, bearing usually about 5 racemose-capitate flowers Flowers greenish-yellow, glabrous, their pedicels distinct but 1 mm. in length or less, the tube about 8 mm. long; lobes oblong elliptic, obtuse, 2 to 2.5 mm. long. Stamens 8, two-seriate, all included, the upper four anthers about one-half as long as the lower four, the filaments slender, distinct. Ovary oblong, about 3 mm. long, glabrous, narrowed upward, the style about 0.5 mm. long, the stigma capitate; disk-scales linear, distant in pairs, about 1 mm. long.

British North Borneo, Mount Kinabalu, Marai Spur, *Clemens 11075,* December 1, 1915, in an open place above the cave. Apparently referable here is a sterile specimen, *Clemens s.n.,* from the same general locality, which differs from the type in having its leaves up to 7 cm. in length.

MELASTOMATACEAE.

Dissochaeta, Blume.

Dissochaeta glabra, sp. nov. § *Disparistemones,* sect. nov.

Frutex scandens, glaber; *foliis* chartaceis, nitidis, superioribus oblongis vel oblongo-ellipticis, basi acutis vel rotundatis, inferioribus majoribus, usque ad 15 cm. longis et 10 cm. latis, ovato-ellipticis, basi leviter cordatis, 5- vel obscure 7-nerviis, apice abrupte acuminatis; *paniculis* terminalibus, usque ad 25 cm. longis, multifloris; *floribus* 4-meris, calyci truncato; *petalis* circiter 3.5 mm. longis; *staminibus* 8, valde inaequalibus, *antheris* majoribus antice breviter biappendiculatis appendicibus circiter 1 mm. longis, postice breviter appendiculatis; minoribus (sterilis) antice appendicibus 2 filiformibus circiter 3.5 mm. longis instructis.

A scandent glabrous shrub, or the younger parts of the inflorescence very slightly and obscurely furfuraceous. Branches subolivaceous, smooth, terete, or the younger ones slightly compressed. Leaves opposite, chartaceous, brittle when dry, olivaceous, shining, glabrous, prominently and abruptly acuminate, the upper ones smaller than the others, oblong to oblong-elliptic, base subacute to rounded, the lower ones ovate-elliptic, slightly cordate, up to 15 cm. long and 10 cm. wide, all 5- or obscurely 7-nerved, entire, the longitudinal and transverse nerves prominent; petioles 1.5 to 2 cm. long, their margins somewhat tuberculate. Panicles terminal, ample, narrowly pyramidal, about 25 cm. long, the branches opposite, distant, the lower ones about 11 cm. long. Flowers white, 4-merous, in 3- to 5-flowered umbels at the tips of the ultimate branchlets, bracts and bracteoles none, the pedicels 2 to 3 mm. long. Calyx about 3.5 mm. long, 2.5 mm. in diameter, base acute, apex truncate, very obscurely 4-denticulate, the limb produced about 1.5 mm. Petals 4, inequilaterally obovate, about 3.5 mm. long, subacute. Fertile stamens 4, their filaments flattened, about 5 mm. long, the anthers almost S-shaped, as long as the filaments, somewhat rostrate-acuminate, the connectives not produced, the anterior appendages less than 1 mm. long, thin, the dorsal appendage thin, membranaceous, about as long as the anterior ones; sterile filaments much shorter than the fertile ones, each with a pair of slender, filiform, reflexed, 3 to 3.5 mm. long appendages at the apex.

British North Borneo, Kalabakan watershed, along the Pinajas River, *Villamil 242,* October 8, 1916, altitude about 20 meters.

An anomalous species on account of its fertile anthers lacking the long filiform anterior appendages, which, however, are present at the apices of the sterile filaments. It agrees best with the characters of the § *Diplostemones,* but on account of the short anterior and posterior appendages of the fertile anthers, and the filiform appendages of the sterile filaments, I have made it the type of a new section, *Disparistemones.*

HALORRHAGACEAE.

Halorrhagis, Forster.

Halorrhagis scabra, (Koenig) Benth., var. **elongata,** Schindl. in Engl. Pflanzenreich, **25** (1905) 20.

British North Borneo, Jesselton, *Topping 1454,* October, 1915, a common weed along roadsides.

Southern China and the Philippines, with a variety in India.

ERICACEAE.

Vaccinium, Linnaeus.

Vaccinium clementis, sp. nov.

Frutex vel arbor usque ad 12 m. altus, glaber; *foliis* oblongo-obovatis, usque ad 3.5 cm. longis, apice rotundatis, basi cuneatis, integris, subtus puncticulatis, nervis utrinque 2 vel 3, adscendentibus, obscuris; *racemis* in axillis superioribus, 1.5 ad 3 cm. longis, paucifloris; *floribus* circiter 1 cm. longis; *corolla* leviter inflata, sursum leviter angustata; *filamentis* villosis; antheris 1 mm. longis, dorso minute 2-aristatis, appendicibus tubulosis, latis.

A shrub or tree attaining a height of 12 m. glabrous or nearly so. Branches slender, terete, reddish-brown or somewhat grayish, smooth, the branchlets somewhat angular. Leaves alternate, coriaceous, entire, brownish or olivaceous when dry, shining, oblong-obovate, 2 to 3.5 cm. long, 0.8 to 1.5 mm. wide, apex rounded, base gradually narrowed from above the middle, cuneate, margins somewhat recurved, the lower surface more or less glandular-puncticulate; midrib rather distinct on the lower surface, the lateral nerves 2 or 3 on each side of the midrib, mostly basal or sub-basal, sharply ascending, slender, anastomosing, not prominent; petioles about 1 mm. long. Racemes solitary in the upper axils, glabrous or very obscurely pubescent, 1.5 to 3 cm. long, few-flowered, rarely more than 6 flowers in a raceme, the pedicels about 5 mm. long, spreading or somewhat recurved, slightly elongated in fruit. Flowers white, about 1 cm. long, cylindric or subcylindric. Calyx somewhat turbinate, about 3 mm. long, very slightly pubescent, the teeth 5, orbicular-ovate, rounded, about 1 mm. long. Corolla glabrous externally, somewhat villous inside, 8 to 9 mm. long, slightly inflated, slightly narrowed upward, the lobes 5, recurved, orbicular or orbicular-ovate, rounded, about 1 mm. long. Stamens 10; filaments villous, about 2.5 mm. long; anthers about 1 mm. long, minutely 2-awned on the back, the appendages tubular, short, broad. Top of the ovary densely villous; style about 8 mm. long, villous except the upper one-fourth. Immature fruits ovoid, about 4 mm. long, glabrous except the tip inside the calyx-teeth which is densely villous.

SARAWAK, Mount Santubong, *Native collector 2235* (type); Mt. Poë, *Foxworthy 204*, May, 1908, summit altitude 1300 m.; DUTCH BORNEO, G. Kelam, *Hallier 2476*, doubtfully identified as *Vaccinium buxifolium* Hook. f. as a variety; BRITISH NORTH BORNEO, Mount Kinabalu, Gurulau Spur, *Clemens s.n.*, November 8, 1915, sterile.

The specimens resemble *Vaccinium varingaefolium*, Miq. and *V. lucidum*, Miq., in many features, but the species is distinguished by its vegetative and floral characters. It is apparently most closely allied to the Philippine *Vaccinium palawanense*, Merr., but has smaller, diverently shaped leaves and somewhat larger flowers. It is not closely allied to *Vaccinium buxifolium*, Hook. f., of which I have excellnt specimens from the type locality, *Clemens 10665*.

Vaccinium caudatifolium, sp. nov.

Frutex vel arbor partibus junioribus inflorescentiisque exceptis glaber; *foliis* coriaceis, lanceolatis, vel oblongo-lanceolatis, usque ad 15 cm. longis, integris, in siccitate olivaceis vel brunneo-olivaceis, utrinque nitidis, laevibus, concoloribus, apice tenuissime caudato-acuminatis, basi acutis, nervis utrinque 4 vel 5, adscendentibus, tenuissimis, utrinque obscuris; *racemis* axillaribus, solitariis vel fasciculatis, tenuibus, usque ad 5 cm. longis, laxifloris; *floribus* minutis, circiter 2.5 mm. longis, ellipsoideis, 5-angulatis; *antheris* dorso minute 2-aristatis, appendicibus tenuissimis, circiter 2 mm. longis.

A shrub or tree, the branchlets and inflorescence somewhat pubescent with short brownish hairs, otherwise glabrous. Branches slender, terete, reddish-brown, sparingly lenticellate, the branchlets very slender, somewhat angled, puberulent. Leaves numerous, alternate, coriaceous, smooth, shining, lanceolate to oblong-lanceolate, entire, 9 to 15 cm. long, 2 to 4 cm. wide, base acute, apex very slenderly and sharply caudate-acuminate, the acumen up to 3 cm. in length, both surfaces brownish-olivaceous or olivaceous when dry; midrib prominent, impressed on the upper surface; lateral nerves very slender, obscure, sharply ascending, 4 or 5 on each side of the midrib, rather more distinct on the upper than on the lower surface, obscurely anastomosing, the reticulations lax, obscure, or nearly obsolete; petioles 2 to 3 mm. long, when young puberulent, in age glabrous. Racemes axillary, solitary or fascicled, slender, lax, up to 5 cm. in length, brownish-puberulent. Flowers scattered, small, subelliptic, about 2.5 mm. long, their pedicels slender, about 6 mm. long, the bracts lanceolate to oblong-lanceolate, sharply acuminate, 2.5 to 3.5 mm. long, somewhat puberulent, the bracteoles two, linear-lanceolate, acuminate, 1.6 mm. long, borne on the lower one-half of the pedicel. Calyx puberulent, the tube globose, about 1 mm. in diameter, the lobes 5, oblong, acuminate, somewhat spreading, puberulent, 1 mm. long. Corolla-tube ellipsoid, somewhat 5-angled, glabrous, about 2 mm. long and 1.5 mm. in diameter, slightly contracted at the throat, the 5 lobes oblong, obtuse, recurved, less than 1 mm. long. Stamens 10; filaments pubescent, about 1 mm. long; anthers about 1.3 mm. long, inflated below, the back minutely 2-spurred, the appendages very slender, about 1 mm. long. Top of the ovary pubescent. Young fruit somewhat turbinate, sparingly pubescent, truncate, about 3 mm. in diameter.

SARAWAK, *Native collector 1679* (type), *2792* (Bur. Sci.), the former without definite locality, the latter from Liu-Matu, Baram, November 1, 1914.

A very characteristic species, readily distinguished by its obscurely nerved, very slenderly and sharply caudate-acuminate leaves and its small flowers. It resembles *Vaccinium dunalianum*, Wight, of British India, but differs from that species in numerous characters.

Vaccinium elliptifolium, sp. nov.

Ut videtur frutex erectus, foliis subtus in costa et petiolis ramulisque junioribus pubescentibus, inflorescentiis cinereo-villosis; *foliis* ellipticis, crasse coriaceis utrinque subaequaliter rotundatis, apice retusis, 2 ad 4 cm. longis, olivaceis, nitidis, subtus obscure glandulosis, nervis utrinque 3 vel 4, adscendentibus, tenuibus; *racemis* 2 ad 3 cm. longis, axillaribus, solitariis, bracteis aciculatis, minutis; *floribus* 5-meris, circiter 12 mm. longis; *calycis* lobis circiter 2 mm. longis, ciliatis, obtusis; *corolla* circiter 9 mm. longa, extus glabra, intus leviter villosa, sursum angustata; *filamentis* villosis; antheris oblongis, haud aristatis, appendicibus brevissimis, latis, truncatis; *fructibus* junioribus cinereo-villosis.

Apparently an erect shrub, the branchlets, lower surface of the leaves along the midrib, and the petioles distinctly pubescent, the inflorescences rather prominently cinereous-villous. Branches dull-brownish, terete, glabrous. Leaves rather crowded, thickly coriaceous, elliptic, entire, 2 to 4 cm. long, 1.3 to 2 cm. wide, subequally rounded at base and apex, the apex retuse, olivaceous and shining when dry, the lower surface somewhat paler than the upper, obscurely glandular-punctate; lateral nerves 3 or 4 on each side of the midrib, sharply ascending, slender, rather distinct on the lower surface, obscurely anastomosing; petioles stout, about 2.5 mm. long. Racemes axillary, solitary, 2 to 3 cm. long, 6- to 10-flowered, rather prominently cinereous-villous, the pedicels about 5 mm. long, the bracts acicular, 1 to 1.5 mm. long, deciduous. Flowers apparently red, about 12 mm. long. Calyx-tube ovoid-globose, about 2.5 mm. in diameter, villous, the segments 5, ovate, obtuse, villous, about 2 mm. long. Corolla about 9 mm. long, about 3 mm. in diameter below, narrowed upward, the mouth contracted, glabrous outside, somewhat villous inside, the lobes somewhat spreading or recurved, ovate, obtuse, about 1 mm. long. Stamens 10; filaments villous, 3 mm. long; anthers oblong, 1.5 mm. long, not spurred, the appendages stout, broad truncate, scarcely 0.5 mm. long, the two together as wide as the basal part of the anther. Style 8 to 9 mm. long, villous in the lower one-half or two-thirds. Young fruits ovoid-globose, rather densely cinereous-villous, crowned by the erect calyx-lobes.

British North Borneo, Mount Kinabalu, Marai Parai Spur, *Clemens 10894, 11099,* the former in flower, November 22, the latter in young fruit, December 2, 1915.

A characteristic species easily recognizable by its rather small, thickly coriaceous, elliptic, somewhat retuse leaves, and its prominently cinereous-villous racemes.

Vaccinium sarawakense, sp. nov.

Frutex (vel arbor), inflorescentiis obscure castaneo-glanduloso-pubescentibus exceptis glaber; *foliis* ellipticis, coriaceis, in siccitate pallidis, utrinque subaequaliter angustatis, basi acutis, apice acuminatis, usque ad 9 cm. longis, nervis primariis utrinque 2 vel 3, tenuibus, adscendentibus; racemis axillaribus, 3 ad 6 cm. longis; *bracteis* acicularibus, circiter 2 mm. longis, caducis; *floribus* 5-meris, circiter 8 mm. longis; *corolla* sursum angustata, extus glabra intus puberula; *antheris* dorso minute 2-aristatis, appendicibus tubulosis, 1 mm. longis, truncatis; *stylis* glabris.

A shrub or tree quite glabrous except the racemes which are supplied with short, scattered, chestnut-brown, blunt, gland-like hairs. Branches terete, reddish-brown, sometimes grayish, the branchlets somewhat angled. Leaves thickly coriaceous, pale, slightly shining when dry, elliptic, 6 to 9 cm. long, 3 to 4 cm. wide, subequally narrowed to the shortly acuminate apex and the acute or somewhat acuminate base, the margins entire, usually with a pair of marginal glands at the junction with the, petiole, the lower surface very obscurely glandular; primary lateral nerves two or three on each side of the midrib, slender, ascending, obscurely anastomosing, the reticulations lax, not prominent; petioles 5 to 7 mm. long. Racemes axillary, solitary, 3 to 6 cm. long, the flowers 5-merous, rather numerous, about 8 mm. long; bracteoles acicular, caducous, about 2 mm. long; pedicels 4 to 5 mm. long. Calyx about 4 mm. in diameter, shallow, sparingly pubescent or glabrous, the lobes broadly triangular-ovate, acute or obtuse, about 1 mm. long, their margins usually obscurely ciliate with very short hairs. Corolla about 8 mm. long, narrowed upwards, the mouth contracted, below about 2.5 mm. in diameter, glabrous externally, puberulent inside, the lobes erect or somewhat spreading, ovate, obtuse, 1 mm. long. Stamens 10; filaments 3 mm. long, inflated below, villous; anthers oblong, 2 mm. long, the two dorsal awns minute, 0.2 mm. long, the appendages 1 mm. long, cylindric, truncate. Disk prominent, glabrous. Style glabrous, about 1 mm. long.

SARAWAK, Kuching, *Native collector 2177,* (Bur. Sci.), Feb.-June, 1914, the flowers indicated as white.

Probably as closely allied to *Vaccinium ellipticum,* Miq., as to any other species, but readily distinguished by its few-nerved leaves and its floral characters.

Vaccinium hosei, sp. nov.

Species *V. sarawakensi* affinis, differt foliis paullo majoribus, nervis primariis utrinque 4 vel 5, subtus prominentibus, reticulis distinctis, antheris dorso haud aristatis.

A shrub or tree quite glabrous except the racemes which are sparingly pubescent with dark-brown, gland-like, short, blunt hairs. Leaves thickly coriaceous, when dry rather pale on the upper surface, brownish on the lower surface, slightly shining, 7 to 11 cm. long, 3.5 to 5 cm. wide, elliptic, base acute, usually with two marginal glands, apex shortly blunt-acuminate, entire; lateral nerves 4 or 5 on each side of the midrib, rather prominent, ascending, anastomosing, the reticulations lax, rather distinct; petioles stout, 5 to 8 mm. long. Racemes axillary, about 6 cm. long, rather few-flowered, the bracts acicular, 2 to 3 mm. long, deciduous, the pedicels about 5 mm. long. Flowers 5-merous, the corolla narrowly ovoid, narrowed upward, glabrous externally, very obscurely pubescent inside, about 8 mm. long, the lobes ovate, obtuse, 1 mm. long. Stamens 10; filaments 3.5 mm. long, inflated below, villous, the upper one-fourth glabrous; anthers oblong, somewhat flexed in the middle, 2 mm. long, the dorsal awns obsolete, the appendages cylindric, truncate, about 1 mm. long. Disk prominent, glabrous; style about 9 mm. long, somewhat exserted in anthesis, glabrous.

SARAWAK, Baram, *Hose 236*, December, 1894.

The alliance of this species is manifestly with *Vaccinium sarawakense,* Merr., in spite of the fact that the anthers are not awned. It differs from *V. sarawakense,* Merr., notably in its more numerous, much more prominent lateral nerves and more prominent reticulations.

Diplycosia, Blume.

Diplycosia ensifolia, sp. nov.

Frutex epiphyticus, floribus parcissime pubescentibus exceptis glaber; *foliis* lanceolatis vel lineari-lanceolatis, usque ad 20 cm. longis et 1.8 cm. latis, coriaceis, acuminatis, laevibus, basi obtusis vel rotundatis, obscure triplinerviis; *floribus* axillaribus, solitariis vel binis, breviter pedicellatis (pedicello circiter 4 mm. longo); *bracteis* reniformibus; *calye* circiter 5 mm. longo, lobis erectis, ovatis, obtusis; *corolla* ut videtur obovoidea, 5 mm. longa.

An epiphytic shrub, entirely glabrous except the sparingly pubescent flowers. Branches terete, smooth, dark-colored when dry. Leaves alternate, thickly coriaceous, rigid, lanceolate to linear-lanceolate, olivaceous or pale, usually somewhat shining when dry, smooth, 13 to 20 cm. long, 1.2 to 1.8 cm. wide, straight or slightly falcate, base rounded or obtuse, obscurely 3-plinerved, gradually narrowed upward to the slenderly acuminate apex, the midrib and on the larger leaves the basal nerves impressed on the upper surface, on smaller leaves the basal nerves obsolete or nearly so, reticulations obsolete; lateral basal pair of nerves in larger leaves extending nearly to the apex of the leaf as marginal nerves, obsolete on the lower surface; lower surface with scattered, punctate, dark-colored glands; petioles stout, channeled on the upper surface, up to 3 mm. in length. Flowers white tinged with dull lavender, axillary, solitary or in pairs, their pedicels about 4 mm. long, very slightly pubescent, the bracts at the apex of the pedicels two, reniform, rounded, 1.2 mm. long, 2.2 mm. wide, margins obscurely short-ciliate. Calyx-tube somewhat funnel-shaped, the lobes 5, erect, ovate, obtuse, 2 mm. long, their margins obscurely short-ciliate. Corolla apparently obovoid, glabrous, 5 mm. long, the orifice round, about 2 mm. in diameter. Stamens 10; filaments glabrous,2 mm. long; anthers oblong-ovoid, 1.5 mm. long. Ovary globose, glabrous; style 2.5 mm. long. Fruit "white" (not seen).

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Clemens 11027,* December 1, 1916, epiphytic.

A most characteristic species, at once distinguished from all described forms by its very long, narrow, thickly coriaceous leaves.

Rhododendron, Linnaeus.

Rhododendron lineare, sp. nov.

Frutex (forsan epiphyticus), ramulis junioribus et foliis subtus et floribus perspicue castaneo-lepidotis; *foliis* linearibus, 3.5 ad 4 cm. longis, 3 ad 5 mm. latis, pseudoverticillatis, obtusis, coriaceis, costa prominentibus, nervis reticuloque obsoletis; *floribus* circiter 2 cm. longis, campanulato-infundibuliformibus, profunde 5-lobatis, extus lepidotis.

A shrub, perhaps epiphytic, strongly characterized by its very narrow, small leaves. Branches slender, terete, glabrous, irregular, the branchlets densely lepidote, the scales dark-brown, prominent. Leaves verticillate or pseudoverticillate, coriaceous, linear, 3.5 to 4 cm. long, 3 to 5 mm. wide, obtuse at both ends, margins somewhat recurved, brownish-olivaceous, shining, the midrib prominent, impressed on the upper surface, the nerves and reticulations wholly obsolete, the lower surface prominently lepidote, the scales occupying small pits; petioles densely lepidote, 1 to 2 mm. long. Flowers terminal, apparently each inflorescence with 3 or 4 flowers, their pedicels about 8 mm. long, very densely covered with rather large, round, easily detached, dark-brown scales. Calyx disk-like, small, lepidote. Corolla about 2 cm. long, campanulate-infundibuliform, the tube cylindric, about 7 mm. long, externally densely brown-lepidote, the lobes elliptic-oblong, about 12 mm. long and 7 mm wide, rounded, the median portion in the lower one-half with scattered round scales. Stamens 10; filaments very slender, villous at the base; anthers narrowly oblong, 3 mm. long. Ovary and style about 2 cm. long, very densely lepidote, the scales round, rather large, dark-brown, easily detached, the upper part of the style nearly glabrous.

SARAWAK, without definite locality, *Native collector 1161* (Bur. Sci.).

A most characteristic species, at once distinguished from all described forms by its small, linear, very narrow, coriaceous leaves.

Rhododendron kinabaluense, sp. nov.

Frutex vel arbor parva; *ramulis* junioribus plus minusve brunneo-lepidotis; *foliis* verticillatis, ellipticis vel oblongo-ellipticis, coriaceis, usque ad 12 cm. longis, apice obtusis vel obscure latissime obtuse acuminatis, basi acutis vel obtusis, margine recurvatis, supra glabris, subtus plus minusve lepidoto-glandulosis, nervis utrinque circiter 8, subpatulis, prominentibus, anastomosantibus, reticulo laxo; *floribus* hypocrateriformibus, extus cum pedicellis distincte pubescentibus; *tubo* cylindrico, circiter 2 cm. longo, lobis obovatis, rotundatis, circiter 12 mm. diametro; *filamentis* basi villosis; *ovario* oblongo, dense pubescente, stylo glabro.

A shrub or small tree, the branches and branchlets terete, grayish or brownish, the former glabrous, the latter with numerous, subdeciduous, dark-brown scales. Leaves verticillate, usually in threes, thickly coriaceous, elliptic to oblong-elliptic, 8 to 12 cm. long, 4 to 5.5 cm. wide, subequally narrowed to the acute or obtuse base and to the blunt or obscurely and broadly blunt-acuminate apex, the upper surface olivaceous, slightly shining, the lower pale-brownish, with numerous, small, dark-brown, scattered scales sunk in minute pits; midrib very prominent on the lower surface, impressed on the upper surface; lateral nerves about 8 on each side of the midrib, spreading, somewhat curved-anastomosing, very prominent on the lower surface, the reticulations lax, prominent; petioles, when young, lepidote, in age glabrous, stout, 1 to 1.5 cm. long. Heads with about six, pink-purple, apparently nodding, pubescent flowers, the pedicels about 2.5 cm. long, rather densely pubescent with short, spreading, pale hairs. Calyx disk-like, about 2.5 mm. in diameter. Corolla-tube cylindric, about 2 cm. long, 8 mm. wide when flattened, uniformly and prominently pubescent with short, pale, spreading hairs as are the lobes on the back, the lobes obovate or reniform-obovate, about 12 mm. in diameter, broadly rounded. Stamens 10; filaments densely pubescent in the lower 6 mm., otherwise glabrous; anthers oblong, 3 mm. long. Ovary densely pale-pubescent, oblong, about 5 mm. long; style nearly 2 cm. long, glabrous.

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Clemens 10892*, November 22, 1915, altitude probably about 2400 meters.

A species well characterized by its salver-shaped, pubescent flowers, pubescent pedicels, lepidote branchlets, and thickly coriaceous, verticillate leaves which are rather prominently lepidote-glandular on the lower surface, the scattered, small, dark-brown scales being sunk in minute pits.

Rhododendron obscurinervium, sp. nov.

Frutex vel arbor partibus junioribus foliisque subtus parce castaneo-lepidotis exceptis glaber; *foliis* pseudoverticillatis, coriaceis, lanceolatis vel anguste lanceolatis, usque ad 20 cm. longis et 3.3 cm. latis, utrinque angustatis, basi acutis, apice tenuiter acute acuminatis, in siccitate brunneis, nervis utrinque circiter 18, supra obscuris, subtus obsoletis vel subobsoletis;

floribus tubuloso-campanulatis, 3 ad 4 cm. longis, glabris, lobis ellipticis, tubo subaequantibus, bracteolis 1 vel 2, linearibus, usque ad 2 cm. longis, deciduis.

A shrub or small tree, nearly glabrous except the sparingly castaneous-lepidote younger parts and lower surface of the leaves. Branches terete, grayish, smooth, the branchlets reddish-brown, smooth, the younger parts more or less lepidote. Leaves lanceolate to narrowly lanceolate, pseudoverticillate, brown when dry, dull or slightly shining, 10 to 20 cm. long, 1 to 3.3 cm. wide, narrowed below to the acute base and above to the gradually and slenderly acuminate apex, the midrib impressed on the upper surface, very prominent on the lower, the latter with few, scattered, dark-brown scales, ultimately glabrous or nearly so; lateral nerves about 18 on each side of the midrib, obsolete or nearly so on the lower surface, on the upper surface slender, obscure, irregular, obscurely anastomosing, or on small leaves quite obsolete; petioles stout, brown or pruinose, when young sparingly lepidote, 4 to 10 mm. long. Heads with at least five flowers, the intermixed bracts up to 2 cm. long, linear, the pedicels about 2 cm. in length, very sparingly lepidote, ultimately glabrous. Calyx disk-like, about 3 mm. in diameter, each flower subtended by two, rarely one, linear, deciduous bracteoles nearly 2 cm. in length, appearingly like greatly elongated calyx-lobes. Corolla glabrous, tubular-campanulate, the tube 1.5 to 2 cm. long, slightly enlarged upward, the lobes 5, elliptic or narrowly elliptic, about as long as the tube, about 1 cm. wide, rounded. Stamens 10; filaments sparingly pubescent in the lower one-half; anthers oblong, 3.5 mm. long. Ovary narrowly oblong, about 7 mm. long, sparingly pubescent; style glabrous, about 1.6 cm. long.

SARAWAK, without definite locality, *Native collector 1504* (Bur. Sci.).

A species apparently allied to *Rhododendron gracile*, Low, but with relatively much narrower leaves, very sparse scales, the older parts quite glabrous, and smaller flowers.

SYMPLOCACEAE.

Symplocos, Jacquin.

Symplocos brachybotrys, sp. nov. § *Bobua* (*Lodhra?*).

Frutex vel arbor parva, partibus junioribus inflorescentiisque parcissime pubescentibus exceptis glaber, ramis ramulisque brunneis, teretibus; *foliis* ellipticis, usque ad 5 cm. longis, coriaceis, basi acutis vel subacutis, apice rotundatis vel late acutis apiculatisque, haud acuminatis, margine glanduloso-denticulatis, nervis utrinque circiter 6, distinctis, anastomosantibus; *spicis* axillaribus, solitariis, brevissimis, rhachibus circiter 3 mm. longis, 3—1-floris; *fructibus* oblongis, circiter

3 mm. longis, junioribus extus parcissime adpresse hirsutis, calycis lobis elliptico-ovatis, obtusis, plerumque patulis, circiter 2 mm. longis.

A shrub or small tree, nearly glabrous, or the branchlets and inflorescences very sparingly appressed-pubescent. Branches and branchlets terete, dark reddish-brown, somewhat shining, rather slender. Leaves scattered, coriaceous, elliptic, 3 to 5 cm. long, 2.3 to 4 cm. wide, pale yellowish-green when dry, shining, base acute or subacute, apex broadly rounded to somewhat acute, often apiculate, never acuminate, margins minutely glandular-denticulate, the very small teeth nearly obsolete below; lateral nerves about 6 on each side of the midrib, distinct, curved-anastomosing, the reticulations evident; petioles 3 to 4 mm. long, when very young slightly pubescent, ultimately glabrous. Inflorescences reduced to a 1- to 3-flowered, axillary, solitary, very short spike, the rachis sparingly pubescent, up to 3 mm. in length, bearing a single fruit, rarely two, and the scars of one or two fallen fruits. Young fruit oblong, very slightly pubescent, sessile, about 3 mm. long, the calyx-lobes usually spreading, obtuse to rounded, elliptic-ovate, about 2 mm. long, sparingly ciliate.

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Clemens 10961,* in an open place, altitude not indicated, the fresh fruits dull purplish-red.

A most characteristic species readily recognizable by its elliptic, usually rounded leaves, and its very abbreviated axillary, solitary spikes, these usually bearing but a single fruit.

Symplocos clementis, sp. nov. § *Bobua, Lodhra.*

Frutex circiter 4 m. altus, partibus junioribus dense sordide fusco-pubescentibus; *foliis* oblongis vel oblongo-lanceolatis, coriaceis, usque ad 3.5 cm. longis, basi acutis, apice acute acuminatis, margine plerumque valde reflexis, glanduloso-serrulatis, supra glabris, nitidis, subtus plus minusve adpresse pubescentibus praesertim in costa nervisque, nervis lateralibus utrinque 7 ad 9; *floribus* axillaribus, solitariis, pedicellatis, circiter 8 mm. diametro; *bracteolis* oblongo-lanceolatis, acuminatis, 3 ad 4 mm. longis; *fructibus* oblongo-ellipsoideis, junioribus leviter adpresse pubescentibus, vetustioribus glabris, nigro-purpureis, circiter 1 cm. longis.

A shrub about 4 m. high, the young branchlets densely appressed-pubescent with dirty brown hairs, the branches slender, terete, brownish, glabrous. Leaves coriaceous, oblong to oblong-lanceolate, 2 to 3.5 cm. long, 5 to 15 mm. wide, the upper surface greenish-olivaceous, somewhat shining, glabrous, the lower paler, appressed-pubescent especially on the midrib and lateral nerves, the base acute, apex sharply acuminate, margins usually strongly reflexed and sharply glandular-serrate, the midrib impressed on the upper surface; lateral nerves 7 to 9 on each side of the midrib, slender, distinct, anastomosing; petioles pubescent, 1 to 2 mm. long. Flowers white, axillary, solitary, about 8 mm. in diameter, their pedicels pubescent, 5 to 6 mm. long, each with two, oblong-lanceolate, acuminate, pubescent, 3 to 4 mm. long, deciduous bracteoles subtending the flower. Calyx somewhat campanulate, pubescent, the lobes 5, broadly ovate, rounded, about 1 mm. long, margins minutely ciliate. Petals orbicular-ovate, rounded, 4 mm. long. Stamens about 40; filaments 3 to 5 mm. long. Young fruits sparingly appressed-pubescent, narrowly oblong, at maturity nearly black, glabrous, oblong-ellipsoid, about 1 cm. long, the pericarp fleshy.

BRITISH NORTH BORNEO, Mount Kinabalu, Paka Cave, *Clemens 10559,* November 12, 1915, along streams, altitude about 3000 meters.

A species in the same group with, and allied to *Symplocos johniana,* Stapf, and *S. zizyphoides,* Stapf, and distinctly closer to the latter from which it is distinguished especially by its smaller leaves which are acute at the base.

Symplocos phanerophlebia, Merr. in Philip. Journ. Sci. **9** (1914) Bot. 382.

BRITISH NORTH BORNEO, Sandakan, *Villamil 182,* March 16, 1913, on hills beyond the Wireless Station, altitude about 40 meters.

The specimen is an excellent match for the type of the species, which was from Leyte. It is distinct from *Symplocos fasciculata,* Zoll., of which I have a large series of specimens from the Malay Peninsula, Java, and Borneo.

CONVOLVULACEAE.

Merremia, Dennstedt.

Merremia hederacea, (Burm.) Hallier f. in Engl. Bot. Jahrb. **18** (1894) 118.

Evolvulus hederaceus, Burm. Fl. Ind. (1768) 77.

Merremia convolvulacea, Dennst. Schl. Hort. Malabar. (1818) 39.

BRITISH NORTH BORNEO, Jesselton, *Topping 1944,* November, 1916.

Tropical Asia and Africa through Malaya to the Philippines and north eastern Australia.

VERBENACEAE.

Callicarpa, Linnaeus.

Callicarpa fulvohirsuta, sp. nov.

Frutex, ramis ramulisque dense fulvo stellato-pubescentibus, pilis hirsutis fulvis additis; *foliis* chartaceis, oblongo-ellipticis, usque ad 14 cm. longis, utrinque subaequaliter angustatis, apice acute acuminatis, basi acutis, dentatis, in siccitate brunneis, supra parce hirsutis, subtus glandulosis, in costa dense stellato-pubescentibus hirsutis, in nervis hirsutis, nervis utrinque circiter 12; *cymis* axillaribus, brevibus, dichotomis, petiolos subaequantibus, *calyci* cupulato, extus parce hirsuto glanduloso, subtruncato, obscure 4-denticulato; *corolla* 3.5 ad 4 mm. longa, extus glandulosa; *staminibus* 4.

A shrub, the branches, branchlets, petioles, midrib, and inflorescences densely fulvous stellate-pubescent with intermixed simple hirsute hairs, the branches terete, the internodes 4 to 7 cm. long. Leaves dark-brown when dry, the lower surface paler than the upper, in general oblong-elliptic, subequally narrowed to the acute base and to the sharply acuminate apex, chartaceous, 12 to 14 cm. long, 5 to 6.5 cm. wide, margins sharply dentate, in the basal portions entire or nearly so, the upper surface densely hirsute on the midrib and with short scattered hairs on the surface, the midrib beneath stellate-pubescent and hirsute, the lateral nerves and primary reticulations sparingly hirsute with short hairs, the whole surface with pale, shining, small waxy glands; lateral nerves about 12 on each side of the midrib, prominent, curved, anastomosing, and with the reticulations dark brown in contrast to the paler surface; petioles 1 to 1.4 cm. long. Cymes axillary, shortly peduncled, dichotomous, about as long as the petioles, rather lax. Flowers 4-merous, white, their pedicels 1 to 1.5 mm. long, hirsute, jointed to the branchlets, the bracts linear-lanceolate, 1 to 3 mm. long. Calyx cup-shaped, subtruncate, obscurely 4-denticulate, about 1.4 mm. long, externally sparingly hirsute and with scattered shining glands. Corolla 3.5 to 4 mm. long, externally glandular, subequally 4-lobed, the lobes oblong, obtuse, about 1.5 mm. long. Stamens 4; anthers glandular on the back. Fruit depressed-globose, red when mature, about 3 mm. in diameter, sparingly glandular.

British North Borneo, Mount Kinabalu, Kibayo to Keung, *Clemens 9846,* October 29, 1915, below an altitude of 1000 meters.

A characteristic species readily distinguishable by its brown leaves, its fulvous indumentum composed of stellate hairs with which are mixed simple hirsute ones, and its short, rather lax, inflorescences. It is similar in very many respects

to *Geunsia havilandii,* King and Gamble, but the indumentum on its leaves is less dense, while its flowers are smaller and with four, not five stamens; and it is hence a true *Callicarpa.*

Hoseanthus, nom. nov.

(*Hosea* Ridley, non Dennst.)

Hoseanthus lobbii, (C. B. Clarke) comb. nov.

Clerodendron lobbii, C. B. Clarke in Hook. f. Fl. Brit. Ind. **4** (1885) 590.

Hosea lobbii, Ridl. in Journ. Str. Branch Roy. As. Soc. **50** (1908) 125.

SARAWAK, *Hose 135, Foxworthy 88*: *Native collector 280, 739* (Bur. Sci.)

The species was originally credited to Penang, localized from a specimen collected by Lobb. There is not the slightest doubt but that Lobb's specimen was from Sarawak, not from Penang. I have here proposed the new generic name *Hoseanthus* for this endemic monotypic Bornean genus, as the generic name proposed by Ridley is invalidated by *Hosea,* Dennst.

Sphenodesme, Jack.

Sphenodesme borneensis, sp. nov.

Frutex scandens ramulis junioribus inflorescentiisque dense ferrugineo-pubescentibus; *foliis* oblongis, coriaceis, usque ad 14 cm. longis, olivaceis, nitidis, glaberrimis vel subtus in costa nervisque leviter pubescentibus, basi rotundatis, apice acuminatis, nervis utrinque 3, subtus valde prominentibus, curvato-adscendentibus; *inflorescentiis* terminalibus, capitulis 5-floris, tenuiter pedunculatis, racemose dispositis, bracteis accrescentibus, ellipticis, usque ad 2 cm. longis, rotundatis; *floribus* 5. mm. longis, prominente ferrugineo-hirsutis, lobis bipartitis; *corolla* 5 mm. longa, glabra.

A scandent woody vine reaching a height of about 8 m. Branches and branchlets slender, terete, lenticellate, reddish-brown, the branches soon becoming quite glabrous, the younger branchlets densely ferruginous-pubescent with somewhat appressed hairs. Leaves opposite, oblong, coriaceous, shining, olivaceous when dry, of about the same color on both surfaces or the lower slightly paler than the upper, 8 to 14 cm. long, 2.5 to 5.5 cm. wide, base rounded, apex rather prominently acuminate, apiculate; lateral nerves 3 on each side of the midrib, the lower two pairs usually leaving the midrib in the lower two cm., very prominent, curved-ascending, anastomosing, the reticulations prominent, in young leaves sparingly pubescent on the lower surface, soon becoming quite glabrous; petioles 5 to 7 mm. long, when young pubescent, becoming

glabrous, not twisted. Inflorescence terminal, 10 to 15 cm. long, the heads arranged in a simple raceme, sometimes supplied with reduced leaves, all parts more or less ferruginous-pubescent. Heads 5-flowered, their peduncles slender, 1 to 2.5 cm. long. Bracts six, elliptic, rounded, often broadly apiculate, more or less pubescent, accrescent, rather coarsely reticulate, 7 to 20 mm. long, 5 to 10 mm. wide. Flowers greenish-white, 5 mm. long, the calyx prominently ferruginous-hirsute with spreading hairs, narrowly funnel-shaped, the lobes 1.5 to 2 mm. long, cleft to about the middle. Corolla as long as the calyx, glabrous, the lobes oblong, obtuse, about 2 mm. long. Style slightly exserted.

SARAWAK, *Native collector 1847* (Bur. Sci.) (type); Santubong, *Foxworthy 450,* June 7, 1908, on forested ridges in forests, altitude about 100 meters, locally known as *sumpin* (Malay).

A characteristic species, readily recognized by its few-nerved leaves, its 5-flowered heads, its elliptic, accrescent bracts, and its cleft calyx teeth. It is apparently most closely addied to *Sphenodesme barbata,* Schauer.

Faradaya, F. Mueller.

Faradaya matthewsii, sp. nov.

Frutex scandens, inflorescentiis parce puberulis exceptis glaber; *foliis* chartaceis vel subcoriaceis, olivaceis, utrinque concoloribus, nitidis, ovatis vel oblongo-ovatis, usque ad 22 cm. longis, acuminatis, integris, basi late rotundatis, subtus utrinque glandulis 2 vel 3 prominentibus disciformibus instructis, nervis utrinque 5 vel 6, prominentibus; inflorescentiis terminalibus; *floribus* albis, circiter 6.5 cm. longis, calyci juniore clauso, inflato, lanceolato, acuminato, 2 ad 2.5 cm. longo, extus glandulis paucis magnis disciformibus instructo; *filamentis* subaequalibus; *ovario* 1-loculare.

A scandent shrub, the stems about 2.5 cm. in diameter, glabrous except the sparingly puberulent inflorescence. Branches terete, smooth, glabrous, subolivaceous, about 5 mm. in diameter. Leaves opposite, chartaceous to subcoriaceous, ovate to oblong-ovate, up to 22 cm. long and 12 cm. wide, shining and olivaceous on both surfaces, entire, apex prominently acuminate, the acumen stout, blunt, base broadly rounded, rarely slightly cordate, the lower surface on each side of the midrib with two or three prominent, brownish, disk-like glands; lateral nerves 5 or 6 on each side of the midrib, prominent, curved, anastomosing, the reticulations lax, prominent; petioles 3.5 to 5 cm. long. Inflorescence terminal, cymose, about 15 cm. long, sometimes with a pair of greatly reduced leaves, somewhat puberulent, the bracts linear, filiform, about

5 mm. long, the bracteoles minute; pedicels up to 1 cm. in length. Flowers 4-merous, white, up to 6.5 cm. long. Calyx, in bud closed, lanceolate, rostrate-acuminate, 2 to 2.5 cm. long, inflated, externally very slightly puberulent and with few, large, scattered, brown, disk-like glands, in anthesis split nearly to the base into two lanceolate, valvate, acuminate lobes which are up to 8 mm. in width. Corolla-tube about 4 cm. long, 3 mm. in diameter below, somewhat widened in the upper 1 cm. the corolla narrowly infundibuliform, the lobes 4, imbricate, obovate, broadly rounded, narrowed below, up to 2.5 cm. wide, 1.5 to 2 cm. long. Stamens 4, equal or subequal, inserted about 2 cm. above the base of the tube, the filaments somewhat exserted, 3.5 cm. long, hirsute below, glabrous above; anthers oblong, versatile, 4 mm. long. Ovary ovoid, 3 mm. in diameter, somewhat cinereous-pubescent with short stiff hairs, 4-lobed, or when young 8-lobed, 1-celled with two parietal placentae, each placenta bearing two ovules; style glabrous, filiform, 6.5 cm. long; style arms 2, short.

British North Borneo, Sandakan, *Villamil 253,* in ravines at an altitude of about 12 meters, the flowers slightly fragrant.

This is the first representative of the genus to be found in the Sunda Islands, several species being known from New Guinea, one from north-eastern Australia, and several from Polynesia. The present species is dedicated to Mr. D. M. Matthews, Conservator of Forests, British North Borneo, and differs from the genus as described in its distinctly 1-celled ovaries, and in its equal or subequal, not didynamous stamens. It is, however, in all essential characters a typical *Faradaya.*

ACANTHACEAE.

Ruellia, Linnaeus.

Ruellia tuberosa, Linn. Sp. Pl. (1753) 635.

Cryphiacanthus barbadensis, Nees in DC. Prodr. **11** (1857) 197.

British North Borneo, Lahad Datu, *Foxworthy 619,* March 25, 1916, a common roadside weed in the town of Lahad Datu, the blue flowers much in evidence along the roadside; if grows in hard clay soil.

A native of tropical America, introduced into Java as an ornamental plant, and now somewhat naturalized there, as it is at Lahad Datu.

RUBIACEAE.

Uncaria, Schreber.

Uncaria toppingii, sp. nov.

Frutex scandens ramulis junioribus et foliis subtus in costa nervisque et pedunculis ferrugineo-hirsutus; *foliis* chartaceis, in siccitate brunneis, oblongis, usque ad 10 cm. longis, basi rotundatis, apice tenuiter caudato-acuminatis, nervis utrinque 7 vel 8; stipulis circiter 1 cm. longis, bilobatis, lobis oblongo-ovatis, acuminatis; *capitulis* longe tenuiterque pedunculatis bracteis magnis involucrantibus instructis; *floribus* sessilibus, ebracteolatis; *calyci* dense appresse ferrugineo-hirsuto, lobis lineari-lanceolatis tubum subaequantibus; *corolla* circiter 14 mm. longa, glabra; *capsulis* anguste ellipsoideis, circiter 1 cm. longis, quam pedicellis tenuibus brevioribus.

A scandent shrub attaining a height of about 3 m., the younger branchlets, lower surface of the leaves on the midrib and lateral nerves, and the long slender peduncles rather densely ferruginous hirsute with subappressed hairs. Branches and branchlets slender, dark-brown, terete. Leaves chartaceous, dark-brown when dry, 8 to 10 cm. long, 3.5 to 4.5 cm. wide, the upper surface glabrous except the somewhat hirsute midrib, base rounded, apex slenderly caudate-acuminate; lateral nerves 7 or 8 on each side of the midrib, prominent on the lower surface, curved-ascending, anastomosing, the reticulations subparallel; petioles pubescent, about 5 mm. long; stipules cleft, the lobes about 1 cm. long, oblong-ovate, acuminate, sparingly ferruginous-hirsute; hooks slender, recurved, stiff, about 1 cm. long. Heads solitary, axillary, in anthesis about 3.5 cm., in fruit about 5 cm. in diameter, their slender peduncles 6 to 8 cm. long, each head subtended by an involucre of 4 or 5 bracts, the bracts villous externally, 10 to 13 mm. long, oblong-ovate, acuminate, membranaceous, the margins below rather coarsely lobed, the basal portions united. Flowers numerous, greenish-white, ebracteolate, sessile or nearly so, the calyx-tube densely appressed ferruginous-hirsute, the lobes 5, linear-lanceolate, acuminate, 3 to 4 mm. long, about equalling the tube. Corolla-tube glabrous or nearly so, slender, 11 to 12 mm. long, the lobes elliptic-obovate, rounded, about 3 mm. long. Style exserted about 6 mm., the stigma narrowly obovoid-oblong. Capsules narrowly ellipsoid, narrowed at both ends, about 1 cm. long, their pedicels slender, equalling or slightly exceeding the capsule.

British North Borneo, Mount Kinabalu, Kiau, *Topping 1519,* November 1, 1916, on hillsides, altitude about 900 meters.

A species in the alliance with *Uncaria glabrata,* DC., well characterized, however, by its long and slender peduncles. It differs from de Candolle's species also in its more numerous nerves, and in many details of its flowers.

The Folk-tales of Indonesia and Indo-China.

By R. O. Winstedt.

The area over which a folk-tale has spread proves nothing conclusively except the range of its popularity. But in view of Schmidt's synthesis of the Austroasiatic and Malayo-Polynesian families of language and of the evidence which Professor Kern has marshalled to show that Indo-China possibly was the region whence the Malay race descended on the Archipelago, it is interesting to note the occurrence of identical tales in the Indonesian and Mon-Khmer languages. For the folk-lore of Indo-China I have consulted Aymonier's *Textes Khmèrs,* Landes' *Contes et Légendes Annamites,* Landes' *Contes Tjames* (Saigon 1887) and for Mon or Talaing tales *The Journal of the Burma Research Society.* For folk-tales of the Malay Archipelago, I have used an article on "Contes Javanais" by Dr. Hazeu in a fasciculus entitled *Hommage au Congrès des Orientalistes de Hanoi de la part du Bataviaasch Genootschap van Kunsten en Wetenschappen* (Batavia 1902). For folk-tales purely Malay I refer to my *Malay Literature, Part II* (1907) in the series of *Papers on Malay Subjects* published by the F. M. S. Government, to Skeat's *Fables and Folk-tales from an Eastern Forest* (Cambridge, 1901); and also to *Chĕrita Jĕnaka* edited by myself and Mr. Sturrock and to the *Hikayat Pĕlandok* edited by Mr. Dussek, both of them printed in the *Malay Literature Series* (Singapore).

In No. 45 of this Journal I gave in English "Some Mouse-deer tales*": on pp. 13 and 14 of *Malay Literature, Part II,* I have quoted from that paper the tale of how Mouse-deer cheated Tiger over Solomon's gong, which proved to be a wasp's nest, his viol which proved to be a slit bamboo, his saffron rice which proved to be dung, his turban (or belt, in some versions) which proved to be a coiled snake. The Malay version is given in Dussek's *Hikayat Pĕlandok.* There are also Dayak and Javanese and Sundanese versions. It finds a close parallel in "Les Ruses du Lièvre" recorded (pp. 50-60) in Landes' *Contes Tjames,* and is found among the Cambodians (*vide* Aymonier's *Textes Khmêrs*) and among the Annamites (*vide* Landes' *Contes et légendes Annamites*). I will give in outline the Cham version: it is significant that the "hare"—the Cham word is *tapay**—gores (*encorner*) the elephant with his horn (*de la corne*) (p. 59)!

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* The story how Mouse-deer escaped from crocodile by pretending that his leg was a withered twig is very common in India where Jackal takes the place of Mouse-deer. Cp. pp. 230-233, 384, F. A. Steel's "Tales of Punjab."

* Cf. Malay *tupai* "Squirrel."

'One day the tiger, the hare, the otter, the hen, and the elephant went to cut straw to make a house. They left the tiger at their camp and he caught deer and cooked them rice and venison on their return. The next day the otter was left and he dived into the river and caught fish and cooked it for the other beasts. Then the hen took her turn and served up a dish of eggs. Finally it fell to the hare to cater. The hare was at a loss; so filled the rice-pot with dung (*crottes*), mixed it with stinking fish-paste (*nwóe mám*) and invited his companions to regale themselves. The hare pleaded a head-ache and no appetite! He yawned and cried *hay êh taputj; hay êh taputj,* a nonsense cry, suggesting *hwutj êh tapay,* 'I smell *tapaï's* dung:'—a cry which reveals to the beasts what they have eaten! Then they go and load their straw on the back of the elephant, and allow hare, as an invalid, to lie on it. He groans and asks the hen to hand him a fire-brand to keep his body warm. He blows it up and sets fire to the straw! And he shouts to the others to lead the elephant to windward. The otter extinguishes the flames by taking the elephant into the water. The hare, afraid of being killed by his companions, hides himself in the forest. He comes upon a snake who coils round him. The tiger discovers the hare and asks what he is doing. "I've donned a girdle of flowers, an heirloom of mine" says the hare. The tiger wants to put on the girdle. The hare demurs from dawn till noon. Then he bids the tiger get a thorn, and prick the nose of the python. The python uncoils from the hare and coils round the tiger. Hare calls, "Come, men, and kill the tiger. The python has seized him." Men rush up with knives but the tiger bites the python and escapes. Tiger pursues hare and finds him beating a drum! The hare had stopped up the exit of a wasps' nest and was beating the nest and making the wasps buzz. Said the tiger, "What are you doing?" The hare replied, "I'm beating a drum left to me by my ancestors; it is a great solace, when I'm in the mood." The tiger asked to be allowed to beat it. The hare demurred; at last, he consented, adding, "If you wish to get a harmonious sound out of the drum, open the hole below and close that on top." The tiger follows this advice and beats the drum! Out swarm the wasps and sting him! The hare flees from the tiger and coming to a tree, whose branches rub together, climbs into it. The tiger enraged comes to the tree and bids the hare descend to be eaten. "Allow me till noon," pleads the hare, "to enjoy the strains of this *sharanai* (= Malay *sĕrunai*), an heirloom of mine." At noon the wind blew the branches together and made a noise. The tiger thought it was a musical instrument and begged leave to play it. "Eat me," said the hare, "for I can't allow it." The tiger persisted. "Well" said the hare, "wait till the wind blows and then apply your tongue to this interstice." The tiger did so, and his tongue was nipped! "Come men," cried the hare, "the tiger is caught in a tree." As the men came up, the tiger wrenched his tongue free, losing the tip of it, and vanished. In running away, the hare fell into a dry pit. Up came the tiger and asked what he was doing. The hare answered, "Don't you know? To-morrow morning the sky is going to fall: I stay here to avoid being crushed." Said the tiger, "Pity me! Let me get into the pit with you." "I won't" said the hare. The tiger beseeched the hare from dawn till noon, when at last the hare consented. The hare told the tiger to cut a stick and give it to him. He prodded the tiger. "If you play the fool," said the tiger; "I'll make you jump up there, where the sky will crush you." The hare persists and is made to jump up out of the pit. "I'm off for a drink," says the hare, "and I'll return presently." The hare goes to a house where men are feasting and cries to them to go to the pit and kill the tiger. The men run to the pit. The hare enters the house, eats all the cakes and collects cups and bowls and hides them under a mat. He wraps a red kerchief round his head and beats a drum. The tiger roars and the men run home to see their cakes have disappeared. They think the hare is under the mat, beat it with sticks and smash their crockery! They see the hare on the roof, cannot reach him and set fire to the house. The hare leaps on to another roof and escapes. The hare sees the mistress of the house, where he had upset the feast, going to market to buy cakes bananas and sugar. He awaits her return, and pretends to be lying dead on the road. The woman picks him up and puts him in her basket, where he devours her purchases and skips away, when she opens the lid. The hare meets the elephant, who is weeping. "Why do you weep?" asked he. "I and the tiger agreed to roar," said the elephant; "if I trumpeted so as to terrify all the beasts and birds of the forest, I was to eat the tiger: if he roared so as to terrify them, he was to eat me. He won and is going to eat me to-morrow morning." The hare replied, "Let me save you. Get me betel and to-morrow morning, when I run under you and strike you with my horns, pretend to fall down dead and roll over as I butt you." The elephant did so: the hare butted him as he rolled and spat the blood-red betel juice over his body. The tiger saw it and thought the hare had gored the elephant, and he was afraid and fled away. The tiger met a tortoise and told him of what had happened. The tortoise said "Tie me to you with a rattan and I'll take you to kill the hare." The tiger did so; they met the hare and the tiger fled, knocking the tortoise insensible against a tree stump. Presently the tortoise revived. He was bleeding and he said to the tiger, "Lick this betel juice off me." The tiger licked, thinking it was blood.'

For the story of the hare stumbling into a pit and crying out that he was there to avoid the falling sky, there are parallels in my tales recorded in *Journal* No. 45, and in Klinkert's *Hikayat Pĕlandok Djinaka* (Leiden 1885)—which is reprinted in Dussek's *Hikayat Pĕlandok*. And there is a parallel for the Cham story of the hare saving the elephant from the tiger in Skeat's *Fables and Folk-tales*. Skeat's story relates how elephant and tiger wagered to make monkey fall from a tree; whoever succeeded was to be eaten by the other. Tiger succeeded, but when he wanted to claim the penalty, mouse-deer poured molasses down the elephant's back, told him to trumpet as if in pain and standing on his back made believe to gnaw him. The tiger fled in terror, till the ape told him it was only a mouse-deer; but the mouse-deer made tiger flee once more by crying "Why did you not bring two tigers, ape, for my meal instead of one?" Both in my collection and in Klinkert's *Hikayat* betel juice is used by the mouse-deer to simulate blood.

Another Malay mouse-deer tale finds its parallel in Mon (or Talaing) folk-lore, where, according to the translator a "squirrel" takes the place of the mouse-deer. Skeat calls the Malay tale, "The tiger gets his deserts." There is the same tale, with the variation that a fallen tree takes the place of the trap and buffaloes the place of the man and crocodile the place of tiger, in my tales in Journal No. 45 and in Dussek's "Hikayat Kanchil" in the book *Hikayat Pĕlandok.* The Mon tale has even the same literary device as the Malay story wherein a road, a tree, a sleeping-mat and a dish-cover are severally consulted on the question of altruism —*vide* p. 12 *Malay Literature, Part II,* and p. 2 *Hikayat Pĕlandok.* The Mon tale has been recorded by Stewart on p. 49, Vol. IV, Part I (April 1914) of the *Journal of the Burma Research Society*:—

"Long ago, a man went to the forest and found a tiger caught in a trap. 'Set me free' the tiger called to him, 'O lord of benefits.'

'If I set you free, am I safe from you? Will you eat me?'

'I will not eat you. Do but set me free.' So the man went and released the tiger and the tiger said, 'I've long been without food and now I am going to eat you.'

'It is not fit that you should eat the man who set you free. But let us go and hear the judgment of the Dewatas of the tree in the middle of the clearing.........O Dewatas, I set the tiger free. Is it fit or not that he should eat me?'

And the Dewatas of the tree replied, 'Lo, men come and go and rest under my shade. My branches they break and sit upon them. Therefore,' said the Dewatas of the tree, 'it is fit that the tiger eat thee.'

Then the tiger said, 'Now I am going to eat you.' But the man said, 'Nay, we will go to the Dewatas of the Bridge........ 'Oh Dewatas, the tiger was caught in a trap and I set him free. Is it fit or not that he should eat me?' And the Dewatas of the Bridge replied, 'Lo, men cross over upon me and some use me for unworthy purposes. Therefore' said the Dewatas of the Bridge, 'it is fit that the tiger eat thee.'

'Now' said the tiger, 'I am going to eat you.' 'Wait yet a little' said the man. 'When you have the third judgment in your favour, eat me.' So they went and came to a squirrel, and the squirrel when he saw the man fled. The man followed, shouting, "Wait, be our instructor and decide our case.' Hearing this, the squirrel stopped and said, 'Don't you come near; speak to me from a distance.' Then the man told the circumstances of the case and the squirrel said, 'I myself did not see these things happen. I cannot decide. Show me the place where the tiger was caught. Let us go and see. But how shall we go? I do not trust you two. Let the tiger go first, the man next and I will follow.' When they came to the trap, the squirrel asked, 'How was the tiger placed. Show me, tiger-beast—get into the trap—how you were bound, how you were released. Have you tied him fast? Now tiger can you move?' 'Hardly at all,' said the tiger. 'Oh man, is he tied fast?' 'As fast as can be' said the man. 'Tiger' said the squirrel, 'you have no conscience. Let the man go as he came. I will go as I came. Let the tiger remain in the trap. Thus I give judgment?"

This is a very common Indian story. It is told in the *Gul Bakuwali*. It may be found also in F. A. Steel's *Tales of the Punjab* (pp. 107, 307, 336) where a *pipal* tree, a buffalo yoked to an oil-press and the road are asked about altruism. And it occurs in Thibet.

There is a set of Malay 'clock' sayings:—

Bangau, bangau! kĕnapa kau-kurus?
Bagai-mana aku ta' kurus? Ikan ta' timbul.

Ikan, ikan! Kĕnapa ta' timbul?
Bagai-mana aku 'nak timbul?
Rumput tĕrlalu panjang.

Rumput, rumput! Kĕnapa kau-panjang?
Bagai-mana aku ta' panjang?
Kĕrbau ta' makan aku.

Kĕrbau, kĕrbau! Makan rumput.
Bagai-mana aku nak makan?
Pĕrut tĕrlampau sakit.

Pĕrut, pĕrut! Kĕnapa kau-sakit?
Bagai-mana aku ta' sakit?
Makan nasi mĕntah.

Nasi, nasi! Kĕnapa kau-mĕntah?
Kayu habis basah.

Kayu, kayu. Kĕnapa kau-basah?
Bagai-mana aku ta' basah?
Hujan mĕnimpa aku.

Hujan, hujan! Kĕnapa kau-timpa kayu?
Bagai-mana aku ta' timpa?
Katak mĕmanggil aku.

Katak, katak! Kĕnapa kau-panggil hujan?
Bagai-mana aku ta' panggil?
Ular 'nak makan aku.

Ular, ular! Kĕnapa makan katak?
Bagai-mana aku ta' makan?
Sudah Memang makanan kami.

Contes Tjames No. XVII gives a "Chanson d'Enfants," of which the first couplet is almost identical:—

"Aigrette! aigrette! Pourquoi es tu maigre?—Si je suis maigre, c'est que les crevettes ne montent pas. Crevette! crevette! Pourquoi ne montes-tu pas? Si je ne monte pas, c'est, que les herbes me retiennent. Herbe! herbe! Pourquoi foisonnes-tu? Si je foisonne, c'est que le buffle ne me mange pas. Buffle! buffle! Pourquoi ne manges-tu pas? Si je ne mange pas, c'est que le piquet ne se défait pas. Piquet! piquet! pourquoi ne te défais-tu pas? Si je ne me défais pas, c'est que bêk ne garde pas. Bêk! bêk! Pourquoi ne gardes-tu pas? Si je ne garde pas, c'est que j'ai le ventre gonflè. Ventre! ventre! Pourquoi est-tu gonflé? Si je suis gonflé c'est par le riz cru. Riz! riz! Pourquoi es-tu cru? Si je suis cru c'est que le bois est mouillé. Bois! bois! Pourquoi es-tu mouillé? Si je suis mouillé, c'est que la pluie est continue. Pluie! pluie! Pourquoi es-tu continue? Si je suis continue, c'est que la grenouille se gratte le derrière. Grenouille! grenouille! Pourquoi te grattes-tu? Si je me gratte c'est que nos aïeules se sont grattées. Comment pourrais-je ne pas me gratter?" There is a parallel in Talaing (or Mon):—vide p. 68, Vol. IV Part I *Journal of the Burma Research Society* (*Rangoon* 1914).

Tree, tree why are you crooked?
The heron perched on me.

Heron, heron why did you perch?
To watch a fish.

Fish, fish why did you rise?
Because the buffalo waded.

Buffalo, buffalo, why did you wade?
Because the herd beat me.

Herd, herd, why did you beat?
Because I was hungry for rice.

Rice, rice why weren't you boiling?
Because the fire didn't blaze.

Fire, fire why didn't you blaze?
Because the firewood was damp.

Firewood, firewood, why were you damp?
Because the rain rained.

Rain, rain why did you rain?
Because the frog called.

Frog, frog, why did you call?
Because I was thirsty.

Little blackguard frog, in the well under the
banyan tree is there not enough to drink?

But Lal Behari Day, tells us in his 'Folk-Tales of Bengal' (Macmillan 1883) that every orthodox Bengali story ends with a very similar set of lines as a formula.

In *Malay Literature,* Part II, pp. 20-22, 63-67, I pointed out how very like the Malay tale of "Si Lunchai" is to the Burmese story of "Saw Kay." Has this Burmese tale perhaps a Mon origin?

On p. 62 of the same pamphlet or in *Chĕrita Jĕnaka* will be found an outline of the Malay story of Pa Bĕlalang:—*Chĕrita Jĕnaka* gives the tale at length in Malay. A. F. von Dewall also has printed "Tjĕritĕra Pak Bĕlalang" in his *Bunga Rampai,* Part IV (Batavia, 1902). The tale occurs in Central Celebes, among the Bataks and in Macassar—*vide* pp. 377-379 of a paper by Dr. Adriani on the literature of the Toradja (*Tijdschrift, Bat. Gen. XI, deel 4*). Among the Sundanese, the hero bears the name of Aki Bolong (cf. Grashuis' *Soendaneesch Leesboek*); among the Javanese the name of Pak Bandjir—in 1873 R. F. Bastiaan printed a metrical version of "Pak Bandjir" (Semarang, von Dorp). And Dr. Hazeu mentions a tale known in Batavia and called "Djankar-Djangkrik" which is a variant of "Pak Bandjir." Now Niemann has pointed out (*Bijdragen, Koninklijk Instituut 6* I p. 348) how the Khmer story of Thmènh Chey (Aymonier, *Textes Khmèrs,* pp. 20-30) has many points of resemblance with the Indonesian story. For instance. Thménh Chey is ordered by a prince of Cambodia to solve a riddle propounded by the emperor of China, namely as to the number of seeds in a Chinese water-melon; and by a lucky accident, such as saved Pa Belalang on a similar occasion, Thménh Chey solves it.

Dr. Hazeu gives a Batavian story of "Si Kĕbayan," which bears resemblance to the adventures of A. Lev. recorded on p. 3. sqq. of Aymonier's *Textes Khmèrs.* A man called Pak Bali wants to marry his daughter to some one with a "sharp nose" (*hidong tajam*). Kebayan secretes sugar coffee and sweets in Pak Bali's house and wins the daughter by pretending to nose them! Kebayan goes with his father-in-law to cut bamboo, but tiring of the work exclaims, "I smell a tiger," which puts an end to the day's toil. Kebayan and his father-in-law go to the tomb of the latter's wife to pray but growing tired Kebayan exclaims, "I smell the devil," which puts an end to their devotions.

There are the Javanese tales of Watu-Gunong and Nawang-Wulan, which occur moreover among many of the peoples of the Malay Archipelago—see p. 379 of Adriani's paper cited above. Parallels to these tales are to be found in *Contes et lègendes Annamites* (LIII and LIV), in Landes' *Excursions and Reconnaissances* X p. 43. And the story of "Le Fort," VIII in Landes' *Contes Tjames* (Saigon 1887) bears a likeness to the tale of "Todjo."

Landes' *Contes Tjames,* (*Excursions et Reconnaissances* XIII) gives a story called "Noix de Coco" which finds parallels in the Javanese tales of Djaka Deleg, Djaka Selira, Kadal Kentjana, or Djaka kendil (published by Poensen, *Ontjen-Ontjen III;* Batavia, Landsdrukkerij) and the Madurese tale *Tjaret Brakai* (ed. Vreede, Leijde 1887)—*vide* p. 370 of Adriani's paper.

The points of resemblance between the folk-tales of Indonesia and the folk-tales of Indo-China are so numerous and so close that one may venture to doubt if they are due merely to fortuitous borrowing.

Speech
at the
Ceremonial Haircutting of a young child.

EDITED

BY O. T. DUSSEK.

The following speech is in vogue in the Kuala Pilah District and was dictated to me by Enche' Kasah bin Md. Ali, Batu Kikir.

I am indebted to Mr. R. O. Winstedt for valuable assistance in preparing this paper.

ĔNDUI.

Uchapan mĕnchukur budak kĕchil.

(1) Bi-'smi'llahi 'r-rahmani 'r-rahim.
La ilaha il-lallah. Muhamad a'r-rasulu'llah.

(2) Bi-'smillah itu pĕrmulaan nama,
Kĕadaan dzat-nya bĕrsama-sama:
Dzahirkan sifat mĕnyatakan isma,
Kadim dan taat sĕdia lama.

(3) Hai sĕgala anak-nya Adam,
Asal-nya wahi nuru'l khatam,
Di-pĕchah-nya ĕmpat nasir-nya Adam,
Di-pĕchah-nya pula sakalian alam.

(4) Rahim bapa-mu turun ka-ibu-mu,
Ĕmpat-puloh hari nutfah nama-mu,
Dĕlapan-puloh hari alkah nama-mu,
Sa-ratus dua-puloh hari alamah nama-mu.

(5) Di-kandong ibu-mu sĕmbilan bulan,
Lĕbeh atau kurang tiada di-tĕntukan;
Bĕranakkan dikau bĕrapa kĕsakitan,
Bĕrapa-lah pantang minum dan makan.

(6) Chukup sĕmbilan bulan bilangan-nya
Dzahir-lah ĕngkau ka-dalam dunia;
Baharu-lah suka bapa ibu-nya,
Ka-pada ĕngkau banyak kaseh-nya.

(7) Harap ibu-mu bukan sadikit,
Tinggi-lah harap dari pada bukit;
Lama ibu-mu mĕrasaï sakit,
Sĕmbilan bulan tiada bĕrbangkit.

(8) Kĕnangkan oleh-mu sakalian anak,
Tĕtĕkala ĕngkau lagi kanak-kanak;
Apa bila sudah tidur-mu enak,
Di-charikan makan manis dan lĕmak.

(9) Hai anak-ku, jangan kau bantah
Pĕliharaan ibu-mu sangat-lah susah:
Di-aleh ka-kiri kanan pun basah,
Tiada-lah ĕngkau mĕnaroh insaf.

(10) Satĕlah kamu sudah-lah ada,
Siang dan malam ibu-mu jaga,
Tidur pun tidak barang sa-kĕtika,
Makan dan minum tidak bĕrasa.

(11) Bĕrapa-lah dian dĕngan-nya tanglong,
Di-angkat di-tuam lalu di-bĕdong:
Sudah-lah jaga lalu di-dokong,
Kaseh dan sayang tiada bĕrtanggong.

TRANSLATION

(1) In the name of God, the merciful, the compassionate.
There is no God but God: Mohamad is his Prophet.

(2) In the name of God, the first of all Names,
And He and His Name co-existed in the beginning.
Reveal His attributes and declare His Names,
For He is eternal and we His servants from old.

(3) Oh, all ye descendants of Adam,
Sprung from the eternal light of God,
Adam sprang from the four elements:
And thus is descended all creation.

(4) O child, the grace of thy father visited thy mother
And after 40 days thy seed was created,
After 80 days thy blood was made,
After 120 days thy flesh was fashioned.

(5) Nine months in the womb since thy mother conceived,
Roughly but not exactly that period:
With what pain and suffering wast thou born;
What privations she endured.

(6) When nine moons had waxed and waned
Thou came'st into the world:
Then how delighted thy father and mother,
How strong their love for thee.

(7) High are the hopes thy mother builds,
Yea, higher than the hills:
How long she suffered for thee,
Nine long months confined to her couch.

(8) O all ye children, return your mothers' love,
While still ye are young;
Whilst ye slumbered pleasantly
They sought ye sweetmeats and dainties.

(9) And thou, O child, reject not
Thy mother's watchful care,
If she turned thee to the left the right thou defiled'st:
Yet thou knewest not of these things.

(10) When thou wast born,
Unceasing was thy mother's care;
Not a moment did she spare for sleep,
For food she took no thought.

(11) By light of candle and lantern,
How often she poulticed thee and wrapped thee in thy baby garments.
She dandled thee when awake;
Such love and care is not easy to requite.

(12) Tiada-lah tĕntu siang dan malam
Bangun mĕmangku di-dalam kĕlam;
Tĕrkĕjut jaga di-tĕngah malam,
Tidur pun tidak dapat di-tilam.

(13) Kĕnangkan ayah-mu anak bangsawan,
Pĕliharakan dikau sangat kĕsusahan,
Di-pĕlihara dari pada angin dan hujan,
Takut tĕrkĕna pĕnyakit sawan.

(14) Jika ibu-mu ada hamba di-suroh,
Nyamok pun tidak hampir ka-tuboh,
Tirai kĕlambu di-bĕntang, di-buboh,
Lilin dan tanglong di-pasang, di-suloh.

(15) Walau pun ibu-mu ada bĕrhutang,
Kain sa-hĕlai juga di-pinggang,
Basah di-ampai kĕring di-pinggang,
Di-dokong, di-galas tiada bĕrĕnggang.

(16) Kĕnangkan ayah-mu anak bangsawan,
Barang kata-nya jangan di-lawan,
Ibu bapa-mu pĕrhubongan Tuhan,
Baharu-lah sĕmpurna anak bangsawan.

(17) Jika ibu-mu orang-nya kaya,
Di-suroh pĕlihara hamba dan sahaya,
Sĕrta di-kampongkan duit bĕlanja;
Itu pun ĕngkau kurang pĕrchaya.

(18) Apa bila ĕngkau dapat mĕmbilang,
Di-suroh mĕngaji pagi dan pĕtang,
Rumah guru-mu tĕmpat bĕrulang,
Pagi dan pĕtang tiada bĕrsĕlang.

(19) Apa-bila ĕngkau dapat mĕngaji,
Ibu-bapa-mu suka-lah hati,
Di-chari-nya ringgit sahari-hari
Hĕndak di-surohkan ĕngkau ka-haji.

(20) Pĕrgi ka-haji tanah yang suchi,
Hĕndak mĕmbuang nama yang kĕji,
Shaikh itu suroh mĕngaji,
Bacha Koran, jangan ĕngkau bĕnchi.

(12) Night and day at times all uncertain,
Ere daylight she rose and dandled thee,
Up to watch thee in dark of night
Nor once could pillow her weary head.

(13) Love too thy father, child of birth so gentle,
Who cared for thee through every travail;
Protected thee from wind and rain,
Lest convulsions should attack thee.

(14) If thy mother has servants at hand,
Then no insects can harm thee,
Thy bed-curtains are ever closed,
Candles and lanterns always alight.

(15) And if thy mother is in debt,
With but one garment to her back,
And this when wet must dry as she wears it,
Yet ever does she care for thee and never leaves thy side.

(16) Love thou thy father, gentle child,
Take care not to disregard his word;
When father and mother are united by God,
Then is thine a perfect lot.

(17) If thy mother is of rich parentage,
Her slaves and servants all attend thee,
And she saves for thee her utmost farthing,
Though thou can'st not understand this.

(18) And when thou can'st count,
Thou must to school morning and noon,
With thy teacher to study the Koran,
Morning and evening without interruption.

(19) And when thou canst read the Holy Book,
How glad will be thy parents;
E'en now they save a share of their earnings,
To send thee on the pilgrimage.

(20) Thou wilt go to the Blessed Land,
To cleanse all that is unclean:
The Shaikh will order thee to read the Book,
Take care never to neglect it.

Gordonia.

By I. H. Burkill.

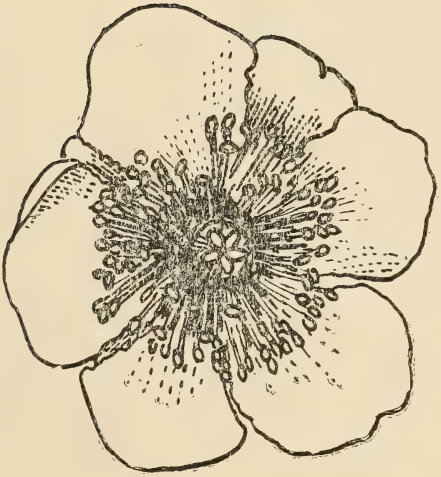

Fig. 1. The flower of *Gordonia singaporiana*, Wall., viewed horizontally. and enlarged by one third.

An enquiry upon a *Gordonia* undertaken for the Forest Department, led into such confused literature, that I have thought it well to draw together the following notes upon the genus in the hope that by publishing them, I may leave it a little more open to investigation. However but for Mr. Ridley's correction of some of the nomenclature in the Journal for 1916, I could not have done even this.

The genus is one of the Ternstroemiaceae, and the relationship to *Camellia* and *Thea* is fairly well suggested by the figure above.

THE FOUNDING OF GORDONIA ON AN AMERICAN PLANT.

The first *Gordonia* to become known was the American Loblolly Bay. In the eighteenth century it was a by-no-means rare shrub in the gardens of the curious in Natural History in Western Europe, as, from its home on the Atlantic seaboard from Maryland southwards to the mouths of the Mississippi, its seeds had been easy to procure, and the plant which attains the size of a tree in its own home, was found to flower in hot houses as a shrub. Linnaeus, as early as 1737, named it *Hypericum Lasianthus* when writing his catalogue of Clifford's garden, and repeated this name in his *Species plantarum.* Then John Ellis, a London merchant, who interested himself especially in what ships could bring him from the New World, upon the examination of a plant which flowered at Clapham, cut it apart from the genus *Hypericum,* and named it *Gordonia* (1770) after a well-known nurseryman, James Gordon then living in London.

From another plant cultivated at Vauxhall, on the outskirts of London, John Sims in 1802 figured flowers and foliage on plate 668 of the *Botanical Magazine.*

Linnaeus accepted the name *Gordonia* from the first and used it in his *Mantissa plantarum altera,* 1771, p. 570.

Into the genus *Gordonia* so established, another American plant was soon placed,—*G. pubescens,* (L'Héritier, *Stirpes novae,* 1784, p. 156), a tree found like *G. Lasianthus* on the Atlantic seaboard of the United States.

GORDONIA FOUND IN ASIA, BUT CALLED CAMELLIA.

On American soil, *Gordonia* has proved to be confined to these two species, the second of which is now reported extinct in a wild state. But above a score of species have been found in Asia.

At first there was some confusion among the European botanists in the East as to what should be called *Gordonia,* so that we meet with *G. oblata* and *G. integrifolia* in Roxburgh's works, and *G. Chilaunia* in Buchanan-Hamilton's, applied to what is now regarded as *Schima*: and there occurs a *G. spectabilis* in the manuscript of William Hunter, of 1803 (printed in *Journal* No. 54, 1909, p. 104) which is doubtless also a *Schima.* At the same period, but on the other hand, a true *Gordonia* of Chinese origin found its way into the genus *Camellia.* This last is the *G. axillaris* of Hongkong,—the first recorded plant of which was brought to the London nursery of Messrs. Whitley, Brames and Milne. In December, 1818, it flowered for the first time, and both the then-existing rival illustrated London botanical journals,—the *Botanical Magazine* and the *Botanical Register,*—obtained a drawing and both published under the date of February 1st, 1819. So similar are these two plates which we know came from the same plant, that they appear to have been drawn from the same branch, and not only from the same branch, but from the same branch with the same flower open. But in the letter press there are differences which must be referred to, the most important of which is that, under plate 349 of the *Botanical Register,* Ker, editing for Sydenham Edwards, wrote that the possessors of the plant had got it some years before from the late Dr. Roxburgh, the Superintendent of the Honourable East India Company's garden at Calcutta, and that Roxburgh had got it from Penang: whereas in the *Botanical Magazine* under plate 2047, Sims wrote that it was thought to be one of some Camellias received a few years previously from a Mr. Robarts from China.

While thus diverging both writers used the name *Camellia axillaris* referring to a manuscript left by Roxburgh, which the one called a Flora of India and the other merely a manuscript in the possession of Sir Joseph Banks. It is evident from the *Botanical Register* that Robert Brown, then librarian to Sir Joseph Banks, had been consulted; and it is therefore hardly possible to avoid the conclusion that Brown had identified the plant, but we do not know from what, as the published *Flora indica* of Roxburgh does not contain *Camellia axillaris.*

ROXBURGH'S CONNECTION WITH THIS PLANT IS VERY DOUBTFUL.

It is well known that before Roxburgh's death in 1815 he had furnished to various scientists copies of his Flora, keeping one in his own possession when he sailed from India, with the intention of revising it for publication, and that seventeen years after the father's death his two sons, Captains Bruce and James Roxburgh, caused the part dealing with the Higher Plants to be printed at Serampore in India, it is said "exactly as he had left it." Are we to assume that Banks had in 1819 a copy with late notes which escaped publication in 1832? It appears so: for, though Sir William Thiselton-Dyer records (Journal of the Linnean Society of London, XIII, 1873, p. 330) that he had searched in vain for the diagnosis of *Camellia axillaris,* (i) Brown would be unlikely to misquote, (ii) the two rivals would be unlikely both to misrepresent him, and (iii) the form of the brief diagnosis is just such as Roxburgh used. It was rendered from English into latin in both works with the term villous for describing the calyx in the *Botanical Register* but the term silky in its place in the *Botanical Magazine.*

So far then we may accept it that Roxburgh appears to have handled a plant from Penang which he called *Camellia axillaris;* but that does not prove it to be the Chinese plant which was described under this name in 1819; and, indeed, it is more likely that Ker invented the connection of the individual in Whitley, Brames and Milne's nursery with Roxburgh as a sequel to Brown's identification than that Sims is wrong in saying that a Mr. Robarts sent it from China. In any case the species does not grow in Penang, and though it could have reached Roxburgh via Penang from the

China coast the diagnosis as quoted is so very meagre, that it might easily apply to another plant of the same order such as occurs in Penang.

There is among the dried plants distributed by Wallich in 1832, a specimen labelled *Camellia axillaris* which is not the *Camellia axillaris* of (? Brown ex) Sims and Ker; and as the diagnosis does not fit it, it is probably some substitute. But it is said that the handwriting is Roxburgh's, and therein must be indubitable proof that Roxburgh used the name for some unrecognised species.

THIS ASIATIC GORDONIA PERSISTS IN CULTIVATION.

Probably from 1819 forward this Chinese plant so introduced by Whitley, Brames and Milne, was not lost to European gardens: it finds mention in several publications of the immediately following years, the chief of which was Robert Sweet's *Hortus Britannicus,* 1826, wherein the genus *Polyspora* was put forward for it and it became *Polyspora axillaris.* In 1842 it was at Kew, having been received from Liège, and flowered, furnishing plate 4019 of the *Botanical Magazine,* under which Sir William Hooker confidently stated it to be Chinese because he had got dried specimens from China. Quite recently (*Gardener's Chronicle,* lxi, p. 250, June 23rd, 1917) it has been figured again from Kew.

There are certain differences between Hooker's plate and the two which went before it, which may be touched upon next.

IT APPEARS TO EXHIBIT GYNODIOECISM BUT THIS WAS NOT SUSPECTED.

It had not escaped the wonderful acumen of Robert Brown that there was something sexually imperfect in the flower of the plant which he saw in 1818: it appeared female; but the flowers of the plant which flowered in Kew in 1842 were apparently fully hermaphrodite. This evidence of the occurrence of gyno-dioecism in the species is now supported by the discovery of similar sexual variations in allied plants. But apparently Choisy who monographed the order in 1855 did not appreciate it, so that (*Mémoires de la Société physique de Genève,* xiv, p. 141) he thought it necessary to make two species,—*G. axillaris* and *G. Lessertii,* of the two, and in doing this he appears also to have made some further confusion.

GORDONIA RECOGNISED AS AN ASIATIC GENUS; THE SEQUENCE IN WHICH SPECIES WERE DETECTED.

Returning to the year 1826 when Sweet tried to establish the genus *Polyspora* for *Camellia axillaris,* not putting it into *Gordonia* perhaps because there were in *Gordonia* the misplaced plants named on p. 134, we come to the announcement by the Dutch botanist Blume of the occurrence of *Gordonia excelsa* in Java, being the first placing of a true Asiatic *Gordonia* correctly. But it was not long before Wallich also recognised the genus; and species were added to species in the following order:—

1826. *G. excelsa,* Blume, a plant which occurs sparsely in the mountain forests of both east and west Java, between 1,500 and 7,000 feet.

1832. *G. obtusa,* Wallich[1], South-western India from the Konkan southwards in mountains between 2,000 and 7,000 feet, plentiful in the Nilgiri Hills.

1832. *G. singaporiana,* Wallich[1], in Singapore at low levels and also in Malacca; in Penang about the hill tops. It is the *G. grandis,* of King, but not of André.

1840. *G. zeylanica,* Wight, Ceylon in the forests from 4,000 to 7,000 feet.

1846. *G. elliptica,* Gardner, Ceylon in the forests of the Central Province, but doubtfully distinct from the last.

1855. *G. speciosa,* Choisy, Ceylon, very local in the higher mountains.

1860. *G. brevifolia,* Hooker fil., Borneo on the Mountain of Kinabalu at 8,000 feet.

1860. *G. Lobbii,* Hooker fil., Borneo in Sarawak.

1874. *G. Maingayi,* Dyer, Perak and Malacca, on the lower slopes of mountains.

1876. *G. dipterosperma,* Kurz, Sikkim Himalaya and Khasia hills. It has been reduced to *G. excelsa,* Blume, in several works.

1880. *G. grandis,* André, a garden plant, imperfectly known.

1886. *G. luzonica,* Vidal, Luzon, common in the higher mountains. It was redescribed in 1906 as *G. fragrans,* Merrill.[2]

1890. *G. Scortechinii,* King, Perak.

1890. *G. imbricata,* King, Perak and Pahang, in the mountains.

1890. *G. multinervis,* King, Perak and Singapore.

1906. *G. sinensis,* Hemsley and E. H. Wilson, S.-W. China on Mount Omi.

1908. *G. Welborni,* Elmer, Southern Philippine islands in mountains.

1910. *G. Balansae,* Pitard, Tonkin on the Mountain of Ravi near Sougi.

1910. *G. tonkinensis,* Pitard, Tonkin, in the neighbourhood of Ninh-binh.

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[1] Wallich's lithographed catalogue of the plants in the East India Company's herbarium has been ruled to be no publication: but these names, are valid nevertheless, though not from 1832.

[2] Mr. Merrill himself reduces this.

G. acuminata, Vidal (*G. Vidalii,* Szyszylowicz) described from Luzon in 1886 is shown by Mr. E. D. Merrill not to be a Gordonia at all.

1916. *G. penangensis,* Ridley, Penang and Singapore. It was misnamed *G. excelsa* by King in 1890.

1916. *G. hirtella,* Ridley, mountains of the Malay Peninsula from Perak to Negri Sembilan.

To these 24 species I have four to add, being *G. taipingensis* from the hills near Taiping, *G. concentricicatrix* from Selangor, *G. Havilandii* from Sarawak and *G. lanceifolia* also from Sarawak, making 28 in all: but as I consider the Asiatic species of *Haemocharis* to be Gordonias, the genus is really in my view of well over 30 species: but all of them want more study.

Attempt to divide Gordonia in conformity with its discontinuous distribution.

Szyszylowicz (in Engler's *Pflanzenfamilien,* iii. part 6, 1893 p. 185) divided the genus Gordonia into two sections, the American species forming the first, and the Asiatic species the second. He gave no sectional names, and did not define the two. Korthals and Pitard have separately gone further in attempts to cut the Asiatic species from the American. Korthals' attempt was made long ago (*Verhandel. over de Natuurlijke Geschiedenis der Nederland overzeeische Bezittingen, Kruidkundig,* 1839-1842). He made two new genera to hold the Malayan species regardless of the existence of *Polyspora;* and on p. 127 he wrote "The plants on which the genera *Antheeischima* and *Closaschima* (his new genera) have been established, were formerly written up and described under the genus *Gordonia;* but a closer comparison with material of the American types, leads me to observe that this union of Indian and American plants can be severed, and leads me on into presenting two new genera for the former, cut out of *Gordonia.*" This shows him dominated by the idea that plants from opposite hemispheres should not be in the same genus. And he continues defining the first genus *Antheeischima* upon doubtful interpretations of its bracts and calyx adding the last sepal (which is seen in fig. 1. to the top and right) to the petals and another sepal to the bracts so as to reduce the number to 3; and on "the stamens being free in *Gordonia* or united into five bundles; but in *Antheeischima* grown together with the petals into a ring." He next admits this genus as rather indistinctly defined but "*Closaschima* differs by reason of its more shrubby growth, lesser development of leaves, and flowers and in some floral characters; it has five or apparently by the enlargement of a bract six sepals, five petals spirally arranged and five stigmas almost without styles."

The last character is that of *Haemocharis* into which his genus has been placed in later years, while the single species making the genus *Antheeischima* has been returned to *Gordonia* as Blume's *G. excelsa.* Yet Korthals continues under *Closaschima* to describe the *C. marginata* as having a style.

Pitard has taken a roughly parallel line. In the *Actes de la Société Linnéenne de Bordeaux,* 1902, Comptes rendus, p. 54, he tries to establish the genus *Nabiasodendron* for the Asiatic Gordonias, at the same time separating the two American species from each other generically. Like Korthals he points to the arrangement of the stamens; but then Korthals did not know the *Gordonia speciosa* of Ceylon which has its stamens in five distinct bundles like *G. Lasianthus,* and Pitard does; so Pitard does not find the character absolute and turns to the capsule for a supplementary one, and after it to anatomical characters.

DISCONTINUOUS DISTRIBUTION IS BY NO MEANS UNUSUAL IN GENERA ALLIED TO GORDONIA. THEIR DEMAND FOR MOISTURE RULES THEIR DISPERSION.

Like Korthals, Pitard seems to have been dominated by an idea that the discontinuous distribution requires that we should find generic characters between those plants which occur in eastern America, and those which occur in eastern Asia. It is a wrong presumption because there are several allied genera equally astride the Pacific, among those comprising the Theeae and Ternstroemieae as the reader will observe if all the genera be enumerated:—

Bonnettia, coasts of tropical S. America.
Archytaea, coasts of the Pacific from S. America to Penang.
Asteropeia, Madagascar.
Thea (including *Camellia*), from Assam to Japan and to Java.
Gordonia (i) eastern coasts of N. America.
  (ii) forests of the Himalaya and S. China to Java chiefly on mountains.
Haemocharis (i) W. Indies and tropical S. America.
  (ii) Borneo, Java, Sumatra and Moluccas.
Schima, as Gordonia (ii).
Hartia, S.-W. China.
Pyrenaria, as Gordonia (ii).
Stewartia (*Stuartia*), (i) Mountains of eastern N. America.
  (ii) Japan.
Ternstroemia, (i) S. America.
  (ii) as Gordonia (ii).
Patascoya, north-west S. America at 10,000 feet.
Anneslea, Himalaya to the Philippine Islands.
Adinandra, (i) as Gordonia (ii).
  (ii) Island of St. Thomé on the West coast of Africa.*
Ternstroemiopsis, Sandwich islands.
Eurya, (i) Mexico and the W. Indies to Venezuela.
  (ii) India to the Pacific.

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* This isolated species needs re-examination.

Freziera, S. America.
Vismea, Canary islands.
Tremanthera, New Guinea.

And from such a review of the genera, allied to *Gordonia,* we turn with at least the suggestion that discontinuous distribution is not so rare in the order as to afford any strong reason for Korthals' and Pitard's endeavour to cut the Asiatic Gordonias from the American.

In fact what we have in the Theeae and Ternstroemieae is such a noteworthy demand for damp air as to restrict them either to damp seaboards or to mountain forests or to rain forests that are not too hot. With a centre about the Pacific, local climates have ruled where they should persist, and the discontinuous distribution is because all but a small part of North America is too dry.

Instead of splitting Gordonia, it apparently should be enlarged by the inclusion of at least the Asiatic species of Haemocharis.

Not only do I fail to follow the bias, but I find characters contrary to Pitard's statement that *Nabiasodendron* has blunt capsules and *Gordonia* pointed, and instead of cutting down *Gordonia,* I believe that *Haemocharis,* at least in the East is not distinguishable from it; and I recommend that the two be examined with a view to union. The only difference is in the presence of a style in *Gordonia* and its absence in *Haemocharis,* a difference which puts *Gordonia singaporiana* for instance on either side of the line according to the view of the moment, and prompted the remark of Koorders and Valeton in regard to *Haemocharis integerrima* (*Mededeelingen 'S Lands Plantentuin,* No. 16, 1896, p. 294) "stylis fere dimidio leviter connatis apice obtuse divergentibus, haec species demarcationes inter genera Gordonia et Laplacea (Haemocharis) fere plane aufert," *i.e.* it comes within a trifle of breaking down the boundary.

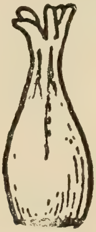

Fig 2. Ovary of *G. singaporiana* at the time of the fall of the corolla showing how undefined in the style.

There is one point to be set out before proceeding, namely that the Asiatic species of *Haemocharis* owe their position in that genus in a very large part to Miquel. They are rare plants in herbaria, which seem to have been seldom consulted of recent years. There is consequently no concensus of modern opinion placing them where they are: and though Otto Kuntze changed the names of some, he was not working as a botanist but as a lexicographer. If the Asiatic species of *Haemocharis* be transferred to *Gordonia,* the genus is enlarged by the following:—

H. vulcanica, O. Kuntze, (sphalm. *vulcania*) being Korthals' *Laplacea vulcanica,* described in 1840 or 1841 from Mt. Meropi in Sumatra.

H. marginata, O. Kuntze, first described in the same place as *Closaschima marginata,* from Mt. Tirin and from near Martapura in Borneo.

H. ovalis, O. Kuntze, first described along with the last two as *Closaschima ovalis* from the forests of Melintang in Sumatra.

H. buxifolia, Szyszylowicz, first described by Miquel as *Laplacea buxifolia* in 1862 in his *Sumatra, zijne Plantenwereld* p. 482, from Paya Kombo in Western Sumatra.

H. aromatica, Szyszylowicz, first described by Miquel along with the last from Mangala in the Lampongs province, and also from Priaman, in Sumatra.

H. subintegerrima first described by Miquel along with the last two, from Kobu-lahat in the Province of Palembang, Sumatra.

H. integerrima, Koorders and Valeton, first described by Miquel in the *Annales Musei botanici Lugduno-Batavi,* iv. 1869, from Preanger in West Java.

H. amboinensis first described as *Laplacea amboinensis* by Miquel in the same place as the last.

H. serrata, Koorders and Valeton, described in *Mededeelingen van 'SLands Plantentuin,* No. 16, 1896, p. 296.

Of the genus Miquel remarks that it descends to low levels (*Sumatra, zijne Plantenwereld,* p. 483), but not in Java. So too does *Gordonia* descend to low levels in the Malay Peninsula, but not in India and Ceylon.

SIZE ATTAINED BY GORDONIAS.

The home of the American species of *Gordonia* is swampy hollows among the pines of the Pine barrens along the sea coast. The home of all the eastern species as far as recorded is sloping ground in dense rain forests and often on the crests of the ridges in these forests. On such crests the trees are apt to be dwarfed by conditions, and it is almost certain that foresters will soon show that the botanists who have described the plants have by far understated the sizes attained by many of the species. These are the sizes so far recorded:—

G. Welborni attains 50 meters or 160 feet.

G. singaporiana 43 meters or 120 feet.
G. excelsa 25 meters or 80 feet.
G. Lasianthus 24 meters or 75 feet.
G. obtusa 20 meters or 60 feet, or perhaps more.
G. multinervis
G. Lobbii } 15 meters or 50 feet.
G. speciosa
G. penangensis
G. Maingayi } 12 meters or 40 feet.
G. sinensis
G. luzonica (*G. fragrans*)
G. Balansae } 8 meters or to 25 feet.
G. pubescens
G. brevifolia 4 meters or 14 feet.

Ridley in the *Journal of the Federated Malay States Museums,* iv, 1909, p. 6, speaks of very large Gordonias occurring on the upper ridges of the Telom district of Pahang. The species was not determined.

But unfortunately so many of these species are known from observation in but one or two localities, and again we know that flowering is no criterion of age, as in European gardens *G. Lasianthus* will flower at 8—10 feet, *G. pubescens* at 4—6 feet, and *G. axillaris* at 3 feet (see Nicholson's *Gardener's Dictionary* article Gordonia) : and we know also that the first named may be reduced by conditions in its own home to a bush (see Sargent, *Manual of the trees of N. America,* 1905, p. 678). *G. singaporiana* also flowers as a bush. Almost all from the economic point of view are inadequately known.

There are no records of the rate of the growth of the eastern Gordonias. Tree No. 1505 V. in the Botanic Gardens, Singapore,—*Gordonia singaporiana,*—is now 145 cm. in circumference at 130 cm. from the ground; and this dimension is here recorded that some observer in the future may measure it again. Its height may be, about 70 feet, and it branches high; but tree 1508 H, which is in the open, branches low down.

THE TIMBER.

The timber of *Gordonia Lasianthus* is stated by Sargent to be light, soft, close-grained, not durable, light red.......occasionally used in cabinet making.

The wood of the eastern species finds a perhaps greater appreciation. Beddome (*Flora Sylvatica,* 1874, under t. 83) wrote of *G. obtusa* that the wood is "white with a straw tint, even grained and pleasant to work, not unlike beech; very generally used for planks, doors, rafters and beams, but warps if not well seasoned." In the *Indian Forester* ii, 1876, p. 23, while stating that the timbers in the sholas or woods of the Nilgiri plateau are of less value than those of the slopes, he named *Gordonia obtusa* with seven others, as being chiefly in use. Gamble, *Flora of Madras,* i, 1915, p. 80, says, wood reddish, hard, and close grained, but little used. Trimen recorded of the Ceylon *G. zeylanica* (*Handbook of the Flora of Ceylon,* i. 1893, p. 111) "wood red, smooth, hard, shining" and after this he adds words which imply that the carpenters up country in Ceylon are familiar with the use of it. Ridley quoting Maingay, (*Agricultural Bulletin of the Straits and Federated Malay States,* i. 1901, p. 48) wrote of the Malayan *G. excelsa,* (but Maingay though doubtless referring to a *Gordonia* may not have had *G. excelsa* before him), "Wood pale red, fine to medium grain, good for houses, beams and boats. Weight 59 lbs. 5¾ oz. and 65 lbs. 7½oz." De Sturler, (*Cat. Descript des espèces de Bois de l'Archipel des Indes Orientales,* 1867, p. 16) stated that a *Gordonia* of W. Java* furnishes a reddish brown wood of great density employed by carpenters; and that it works well. On p. 36 under the name of Aylapia, he stated that a *Gordonia* of Amboyna gave a reddish wood, used but not durable.

Cantley's collector in Malacca in 1886 obtained *G. singaporiana* with the note that the timber is used in house building and is durable. The same in 1885 noted of what appears to be *G. hirtella* that the wood is a dirty dark colour, and its heart black, that it sinks in water and is used for house posts being very durable for this purpose.

Elmer while giving no uses for *G. Welborni* describes the wood as "hard, somewhat burly,........and reddish."

Moll and Janssonius (*Mikrographie des Holtzes der auf Java vorkommender Baumarten,* 1906, p. 334) described the structure of the wood of *G. excelsa,* from Koorders' material; and on p. 338 they described the wood of *Haemocharis integerrima.*

Whitford (*Forests of the Philippines,* part ii, 1911, p. 59) states that *Gordonia luzonica* is of no importance to the lumberman.

THE FOLIAGE.

All the Gordonias are evergreen. Foliation in *G. singaporiana* occurs in flushes of about four leaves generally of increasing size, and the next leaf is small again, but the last leaf may be small especially if it subtends a flower; and leaves at various points may also be small subtending flowers. The leaves persist over more than a year, and there may perhaps be two flushes in the twelve months. At the top of the forest their length may be 15 cm., but young trees in shade carry leaves as much as 35 cm. long, by 10 cm. in breadth.

Along the margins of the leaves of Gordonia, when expanded, little blackish bodies may be seen, which if the leaf has teeth are on their apices, but are not absent if the teeth be so. These are mucilage glands, whose function is to keep the young tissues from injury while still packed in the bud. When the leaves expand, they are already dead in the Asiatic species but I have seen them to be still alive on young expanded leaves of the American *G. pubescens,* and perhaps their structure differs. It is interesting to link this protective function with the demand that the tree makes for moist air. A little nerve runs out to the glands. This same type of gland occurs in allied genera such as *Adinandra,* as in *Gordonia imbricata* and *G. Scortechinii,* where the leaves are toothless. The apex to the leaf also is glandular, and dies as or before the leaf unfolds, often leaving an emargination. Some of the earlier botanists have tried to make a character of this emargination, but the degree to which it has gone in any particular leaf may be but a response to local or to temporary air conditions. Reference may be made to fig. 15, on p. 158, where two flushes are represented. At the commencement of the first, weather conditions appear to have been such as to destroy with the apical gland quite a distinct piece of the neighbouring tissues: these conditions were not repeated. Hairs are present on the young parts which vanish like the glands more or less completely with age: in the leaf bud they are protective similarly. They afford no good specific characters.

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* This is more likely to be *Haemocharis integerrima* than *Gordonia excelsa.* Both have the same vernacular name—Kimandjel.

THE FLOWERS.

Flowers are formed on very short axillary shoots in the upper leaf axils of a flush or in the axils of cataphyllary leaves following. If the terminal bud should die they appear as if terminal on the foliar branches, and this seems particularly to happen in *G. penangensis.* In this species the weight of a falsely terminal capsule on the rather slender branchlets makes it to hang; but in most species they dehisce upwards, see fig. 7 of *G. hirtella.*

The Gordonias, as said, may be got to flower at relatively small sizes. No information is available as to subsequent seed-formation; but in Singapore *G. singaporiana* already seeds at a height of 6 meters.

No information is available as to the formation of flowers in *Gordonia* sexually imperfect, except that a female condition was found in the first observed plant of *G. axillaris.* However as Urban (*Berichte d. deutsch. bot. Gesellschaft,* xiv, 1896, p. 51) has found male and female flowers in the Tropical American species of *Haemocharis*, the occurrence of sexually imperfect flowers in a *Gordonia* is hardly isolated. Further Urban ascribes to the male flower a short style, which makes the definition between *Gordonia* and *Haemocharis* just nothing.

The old trees of *G. singaporiana* in the Botanic Gardens, Singapore, have their flowers fully hermaphrodite. They open in the evening or after dark, facing horizontally or slightly downwards, and fall during the next forenoon. They have a smell which is fairly strong, but hardly fragrant; they are in colour creamy white: they are produced over many months of the year. Infertile flowers perish in the horizontal position of flowering: fertile capsules however resume a more or less upright position and the mature capsule dehisces on the tree facing more or less upwards. It is hygroscopic, closing slowly if wetted and opening slowly again when dried. The walls of the loculi fit over the seeds very closely so that these escape with difficulty, and it is quite common for the capsule to fall to the bottom of the forest with them still enclosed.

The Seed and Seedling.

The germination of *G. singaporiana* has been watched. In it the seed coats are split along the longer free margin of the seed and the radicle is extruded. When this has anchored the cotyledons are raised up and with them the seed coats, from which they escape in consequence of their efforts to attain a more or less horizontal position.

The cotyledons are somewhat arched, and are without the mucilage-glands of the later foliage. With our present scant knowledge of the species of *Gordonia* the characters of the foliage help us more than anything else to a scheme of classification, probably in no way because they are the best, but because we know too little about the capsules. As regards the latter not only do we suffer from the circumstance that from many of the species they have not been collected yet, but also from the fact that the differences in them are difficult to bring out in descriptions unaccompanied by drawings. Towards a remedy the following line blocks may do a little. The next proceeding towards understanding the genus, apart from the collecting of more material, is a re-examination of the Sumatran and Bornean types in Dutch herbaria.

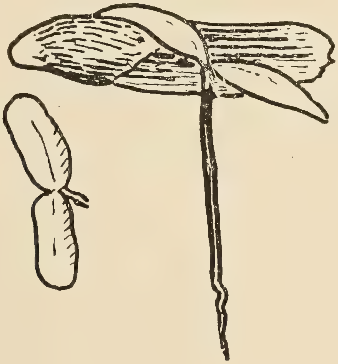


Fig. 3. Seedling of *G. singaporiana* with the cotyledons freeing themselves from the seed coats. To the left are the cotyledons seen from above.

THE KNOWN SPECIES OF GORDONIA AND THE ASIATIC SPECIES OF HAEMOCHARIS.

The most outstanding species of the whole genus is the North American *G. pubescens.* The following enumeration will be started with it.

Gordonia pubescens, *L'Héritier,* Stirpes novae, 1784, p. 156. *G. Altamaha,* Sargent, Manual Trees, N. America, 1905, p. 679.

This species used to be found on the Altamaha river in Georgia but has long been extinct in a wild state. Its leaves have a conspicuous venation. Its flowers are 8 cm. in diameter on short peduncles. Its stamens are inserted separately, and their length relative to the size of the flower is small. The ovary is "truncate and crowned with a slender deciduous style nearly as long as the stamens." The capsule is globose and septicidal from the base. Its seeds are very characteristic, sharply defining it from all other Gordonias: for they are wingless.

There is a line figure of it in Sargent's book.

G. Lasianthus, *Linnaeus,* Mantissa 1771, ii. 570: Sargent, Manual Trees, N. America, 1905, p. 678: in foliar characters lies close to the above: the venation is distinct. The flowers are on long peduncles slender below, but thickening to the flower: they are 6-8 cm. in diameter, white, and with the relatively short stamens united into five bundles at their insertion. The ovary is "gradually contracted into the stout style." The capsule is ovoid and the seeds are winged. Its distribution is from Maryland all along the pine barrens of the Atlantic coast into the Gulf of Texas to the mouths of the Mississippi.

Sargent gives a line figure of it.

Gordonia sinensis, *Hemsley and E. H. Wilson,* in Kew Bull. 1906, p. 153, is described by the authors as of Asiatic Gordonias the most nearly allied to the American species. It has leaves with veins prominent on both surfaces. The white flowers are described as about 5 to 6.5 cm. in diameter. But its capsule is unknown. The petiole is up to 1.5 cm. long. The stigma is said to be "capitate."

Mr. E. H. Wilson got it in the forests of Mt. Omi, Szechuen, Western China.

G. penangensis, *Ridley,* in Journ. Straits Branch, Roy. Asiatic Soc., No. 73, 1916, p. 142: *G. excelsa,* King, in Journ. Asiatic Soc. Bengal, lix, 1890, p. 203, not of Blume.

This species is noteworthy for the slenderness of its branchlets which so bend under the weight of the capsules as to make them pendulous. Its leaves are rather small and the petioles for the genus longish. A little hair persists at maturity on the backs of the blades near to the midrib. Its flowers are 3 cm. in diameter and are described by Curtis as yellow and by Ridley as pinkish yellow. The ovary narrows into a long style. Curtis got it as a medium sized tree at 1,500 and 2,400 feet in Penang island. Ridley as a tall tree at about sea level at Seletar and at Chanchukang in Singapore island. It is to be noted that Pitard's character of blunt capsules for *Nabiasodendron* is not upheld by this species.

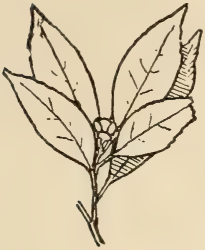


Fig. 4. Foliage and flower of *G. penangensis*, reduced to $\frac{1}{5}$, from Curtis 834.

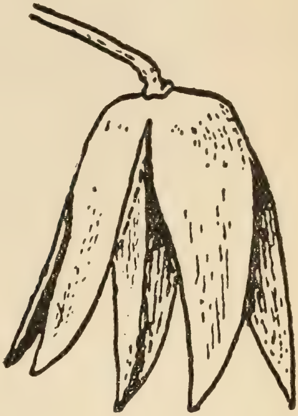


Fig. 5. Capsule of *G. penangensis* nat. size, from Curtis 834.

G. Maingayi, *King,* in Journ. Asiatic Soc. Bengal, lix, 1890, p. 204, is extremely near to *G. penangensis*: and the ovary narrows in the same way into the style.

It was obtained first by Maingay who collected in Malacca, and then by Scortechini and Wray who collected largely in the hills near Taiping but did not record their localities. I have not seen Maingay's plant.

G. taipingensis, one of the new species here described, has large leaves and large flowers. In outline the leaves agree with those of *G. penangensis*.

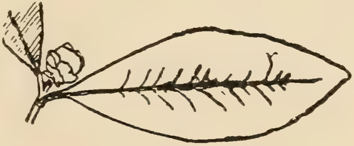


Fig. 6. Leaf and bud of *G. taipingensis*, reduced to $\frac{1}{5}$, from the type specimen

Gordonia taipingensis, *Arbor,* 40- vel 50-pedalis, cortice avellaneo-umbrina. Ramuli ultimi 3 mm. crassi, fusco-avellanei *Folia* elliptica ad elliptico-obovata, basi attenuata, apice acuminata, pergamentacea, margine in superiori parte solum inconspicue crenulata, venis lateralibus supra atque infra visibilibus, glaberrima, ad 29 cm. longa, ad 7 cm. lata: petiolus crassus, ad 2 cm. longus. *Flores* majusculi diametro 6 cm., lutescentes. *Sepala* dense sericea, maxima 15 mm. longa. *Petala* dense sericea, ad 3 cm. longa. *Antherae* numerosissima , versatiles, fere 2 mm. longae: filamenta basi pubescentia, 7—9 mm. longa, omnia discreta in petalis conjunctis inserta. *Ovarium* dense sericeum apice in stylo augustatum, vix 1 cm. longum stylo 2 mm. et stigmatis 2 mm. longis inclusis. Capsula ignota.

PERAK. In monte Taiping hill dicto ad 3,500 ped. alt., cum floribus mense Februario collegerunt Mohamed Haniff et Mohamed Nur, sub numero 2359.

G. obtusa, *Wallich,* Cat. Lith. 1832, No. 1459, name only; Wight, Illustr. 1840, i. p. 99: Dyer in Hooker fil. Flora Brit. India, i. 1875, p. 291; Gamble, Indian Timbers, p. 67: Talbot, Forest Flora Bombay, i. 1909, p. 106: Gamble, Flora Madras Pres., i. 1915, p. 79. *G. obtusifolia,* Wight, loc. cit.

This is clearly near to *G .Maingayi,* as Sir William Thiselton-Dyer pointed out. The flowers are larger and the leaves harsher. The colour of the flowers is creamy white and their diameter about 7.5 cm. The ovary is represented as narrowing into the style, and the style as being tubular almost to the top of the ovary. Sometimes the stigma is 4-lobed. It is a common tree in the little patches of forests which occur in the ravines of the Nilgiri hills chiefly on the eastern side, between 5,000 and 7,000 feet. From the Nilgiri hills it extends southwards and reaches lower levels on the damp western face of the Travancore slopes: also it reaches the Bababuden hills in Mysore.

Wight gave the name *G. parvifolia* to a plant which he obtained in Courtallum with smaller leaves and their margins almost toothless, but later botanists who have had a right to an opinion, have considered it as not distinct from *G. obtusa.*

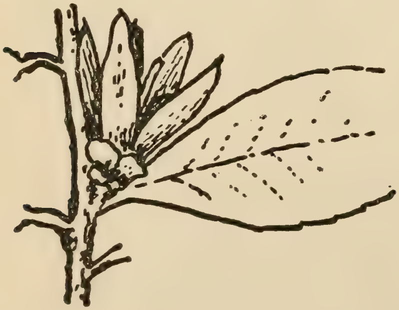


Fig. 7. Capsule of *G. hirtella,* slightly reduced, from Ridley 7350.

G. hirtella, *Ridley,* in Journ. Straits Branch, Roy. Asiatic Soc., No. 73, 1916, p. 142, has foliage like that of *G. taipingensis,* but is widely different in its smaller flowers (only 2 cm. in diameter) and smaller leaves (up to 14 cm. in length). The capsules of *G. taipingensis* being unknown, the comparison cannot proceed to them, but in *G. hirtella* as the drawing shows they are small and the lobes after dehiscence are finger-like. The ovary narrows gradually into the style.

G. hirtella occurs on the Central Chain of mountains of the Malay Peninsula from Gunông Batu Puteh in Perak to the west of Tapah, where Wray got it at his lower camp (Wray No. 116) through Bukit Kutu in Selangor at 3,000 feet, (Ridley 7350) to Bukit Etam at the same height (Kelsall 1848) on the Selangor-Negri Sembilan boundary. Further there is a specimen which appears to be it in the Singapore herbarium collected for Cantley (No. 1296) at "Kandong" by which name is probably indicated the Kendong in Negri Sembilan lying close to the foot of Gunong Tampin. Cantley's collector stated that the heartwood is black, and the albumen dark in colour, and that it makes very durable house posts.

The flowers are creamy white.

G. tonkinensis, *Pitard,* in Lecompte, Flore générale de l'Indo-Chine, i. 1910, p. 348, by the description appears to lie near this place in the sequence. Its elliptic leaves attain 13 cm. in length, and have small crenulations sometimes towards the apex. They have a petiole up to 1 cm. in length, and the venation is almost totally obscured by the coriaceousness of the leaf-blade. Pitard gives a figure of the small capsule, which in shape is not unlike the unexpanded capsule of *G. hirtella,* but from his description is yet smaller by one third.

The flowers are unknown. Abbé Bon collected it near Ninh binh in Tonkin, *i.e.,* not far from the coast.

G. luzonica, *Vidal,* Revis. Pl. Vasc. Filip., 1886, p. 57. *G. fragrans,* Merrill, in Philippine Journ. Science, i. Suppl. 1906, p. 95.

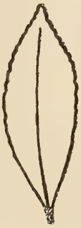


Fig. 8. leaf of *G. luzonica*, reduced to $\frac{1}{5}$ from Borden 809.

With this species we begin distinctly to approach those where the petiole is scarcely present; Merrill in describing it gives the length as 5 mm. or less. The blades of the leaves are oblong lanceolate, the broadest part being not yet carried above the mid length: the margins have obscure crenations in the upper part: the nerves are not so obscure as in many species, the degree being much as in *G. hirtella.* The white flowers are fairly large (5 cm. in diameter), and are fragrant. The ovary is oblong-ovoid. The capsule in shape is very like that of the *G. lanceifolia* figured below, and is described as 3 cm. long.

G. luzonica appears to be not uncommon on the mountains not remote from Manila bay.

I have before me a specimen from Baguio in the Province of Benguet, Luzon, (Curran 5083) which in its foliage and capsules appears to be distinct from *G. luzonica.* The leaves carry a large amount of hair, and are broader than those of *G. luzonica*: the capsules are 4 cm. long and so larger. The Baguio country is a country of ravines with at the best scrubby forest and without the true rain forests in which *G. luzonica* lives usually. It is true that *G. obtusa* occupies somewhat similar ravines in the Nilgiri hills as well as places in the rain forests towards the Arabian Sea, so that the different situation is no base for a case; but the different appearance of the specimen calls for an examination of more material.

G. Welborni, *Elmer,* Leaflets of Philippine Botany, ii. 1908, p. 501, appears like an exaggeration of *G. luzonica.* It is described as the largest in growth of all the Gordonias (30 to 50 metres in height), with a straight trunk a metre thick. The leaves attain a length of 15 cm., which is not larger than those of *G. luzonica,* nor are they relatively wider, but the flowers have petals 3 to 4 cm. long so that their diameter must be 8 cm. The stamens however are described as relatively short. It is to be inferred from the description that the ovary contracts to the style. The flowers are creamy white.

Elmer got this species in the island of Negros in the Cuernes mountains at Dumaguete, and he records that Mrs. Clemens had found it at 4250 feet in the Lanao region of central Mindanao.

G. lanceifolia, a new species, comes near to *G. luzonica.* It has leaves of the same outline but more nearly entire, and differently veined. Its capsules terminate leafless branchlets which may be 4 cm. long. It occurs in Borneo near Kuching.

Gordonia lanceifolia. *Arbor* sempervirens. Rami ultimi pennae corvinae crassi, siccitate nigricantes, glaberrimi. Alabastra externe glaberrima. *Folia* glaberrima, anguste elliptica, vel ad apicem vel in petiolum longe admodum aequaliter angustate subacuminata, margine fere integro levissime recurvo, in siccitate rufo-

nigrescentia, pagina inferiore pallidiore, ad 14 cm. longa ad 3.5 cm. lata: nervi secondarii visibiles, subrecte in aream intramarginalem incurrentes: petioles 3 mm. longus. *Flores* ignoti. *Capsulae* ramos ad 4 cm. longos terminantes, ad 3 cm. longae, in partes quinque loculicide dehiscentes, partibus dorso concavis, sericeis, basi 10 mm. latis deinde gradatim in apiculum angustatis. Semina 25—27 mm. longa.

BORNEO, prope Kuching, collegit G. D. Haviland sub numero 1010.

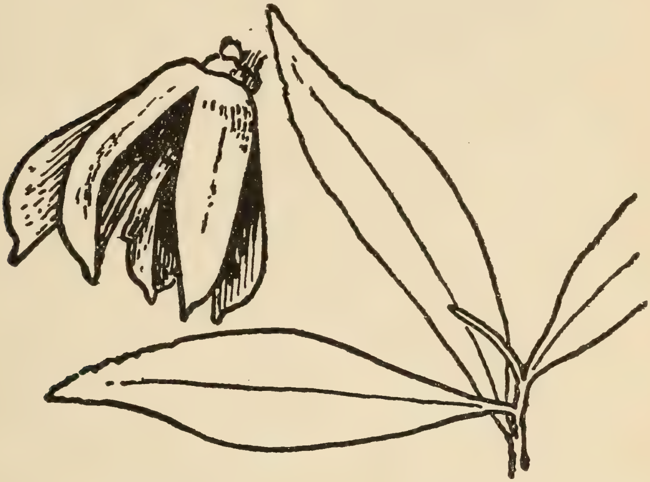


Fig. 9. Leaves of *G. lanceifolia* reduced to $\frac{1}{5}$, and capsule, natural size, from the type specimen.

Haemocharis integerrima, *Koorders and Valeton,* has leaves in shape like those of *G. lanceifolia,* but thicker, with the veins obscured. It occurs in the mountains throughout Java between 2,400 and 7,000 feet.

H. serrata, *Koorders and Valeton,* is contrasted by the authors with the above, and said to differ in its more prominent serrations near its leaf apex, its larger flowers, and hairy style (sic!). It was obtained on Gunong Pulasari in Java.

Haemocharis aromatica, though said to be near *H. vulcanica,* by Miquel, possesses a less marked montane appearance. Its leaves are very minutely subcallously serrulate and have veins which can be traced by being depressed above. No statement is made of the absence of style. If a *Gordonia* the description appears to place it here.

It was got in two varieties in Western and Southern Sumatra.

G. Balansae, *Pitard,* in Lecompte, Flore Générale de l'Indo-Chine, i. 1910, p. 348, is described as having leaves elliptic to

oblanceolate, dentate, coriaceous, and so small as to be only 5 to 10 cm. long by 1.5 to 3.5 cm broad. The dentation removes the species from the neighbourhood of the small leaved Malayan species with which this enumeration will end. At the same time the petiole for the smallness of the blade is rather long (up to 8 mm.). The flowers are yellowish, and apparently about 3 cm. across. The ovary is of three loculi only, and is contracted into the style. The capsule is represented by Pitard as oblique. If this curious condition is at all constant it is very interesting, and a relationship of some closeness to *G. anomala* is suggested thereby.

G. Balansae was collected in the forests of Mount Bavi in Tonkin near to the village of Sougi by the collector Balansa.

G. axillaris, *D. Dietrich,* Syn. Plant. iv. 1850, p. 863: Szyszylowicz in Engl. Pflanzenfam. iii. No. 6, 1893, p. 185. *G. anomala,* Sprengel, Systema, iii. 1826, p. 126: Bentham, Flora Hongkong., 1861, p. 29: Forbes and Hemsley in Journ. Linn. Soc. Lond. Bot. xxxiii. 1886, p. 80. *G. Lessertii,* Szyszylowicz in Engl. Pflanzenfam. iii. No. 6, 1893, p. 185. *Camellia axillaris,* (Roxburgh very doubtfully, R. Brown more probably, through) Ker in Bot. Register, 1819, plate 349, and Sims, Bot. Mag., 1819, plate 2047. *Polyspora axillaris,* Sweet, Hort. Brit. ed. i. 1826, p. 61: Don, Dict. Gard. and Bot. i, 1831, p. 574: Hooker in Bot. Mag. 1843, plate 4019.

This species with elliptic toothed leaves, and a short but distinct petiole, has an ovary which may be made of four or of five carpels. In this perhaps is an indication of affinity to *G. Balansae.* Its flowers are white, and large (6 to 7 cm. in diameter: or according to the Gardener's Chronicle, lxi. p. 250, the flowers recently produced at Kew, 12 cm.). The ovary contracts to the style.

Bentham supposed the plant confined to the island of Hongkong, as he was unable to ascertain any record of its occurrence on the mainland of China.

Matsumura and Hayata, have recorded it from two places in the extreme north of Formosa and from one very near the middle of the island. The old errors of placing its home in Penang should have been forgotten by now, but persist; and Singapore is added equally incorrectly.

G. concentricicatrix, a new species from the lowlands between the Dindings and Malacca, is the first of two in which the broadest part of the leaf is very markedly towards the apex. It occurs as a big tree in the Selangor forests with a clean straight trunk marked by concentric rings which it is hoped to figure later.

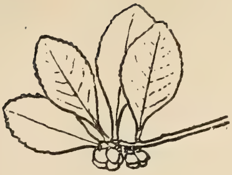


Fig. 10. A branch of *G. concentricicatrix,* reduced to $\frac{1}{5}$, from Abdul Rawi, C. F. 878.

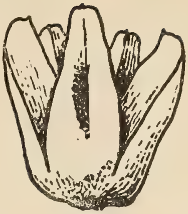


Fig. 11. A capsule of *G. concentricicatrix,* nat. size from Abdul Rawi, C. F. 898.

Gordonia concentricicatrix. *Arbor* alta 100-pedalis, cortice inaequali lineis concentricibus notata. Ramuli ultimi 2 mm. diametro, siccitate badii. *Folia* obovata, margine crenulata, apice abrupte subacuminata vel obtusissima, basi longe gradatim attenuata, glaberrima, crasse pergamentacea nervis secondariis visibilibus, ad 11 cm. longa, ad 5.5 cm. lata: petiolus ad 1 cm. longus. *Flores* lutescentes, ad 4 cm. diametro. *Sepala* dorso dense sericea, ad 1 cm. longa. *Petala* dorso dense sericea, fere ad 2 cm. longa. *Antherae* numerosissimae, versatiles, 2 mm. longae: filamenta glabra, omnia discreta ad insertionem cum petalis in tubo brevi. *Ovarium* dense sericeum, subglobosum, sub-abrupte in stylo 3 mm. longo excurrens. *Capsula* subsessilis, fere ad 4 cm. longa, in partes quinque loculicide dehiscens, partibus (inter species affines) crassis, dorso dimidio superiori impressis, vix mucronulatis. Semina 2 ad 2.5 cm. longa.

PENINSULA MALAYANA, in silvis submontosis versus Fretum Malaccae, ex Dindings, collegit C. C. Curtis cum fructu mense Julio: ex Selangor ad Rantau Panjang collegerunt J. G. Watson, C. F. 878, etiamque Abd'ul Rawi sub numero C. F. 878 mense Aprilo et mense Maio cum floribus et cum fructibus: ex Malacca ad Brisu collegit R. Derry cum floribus sub numero 1048. Indigenae ad Rantau Panjang *Kelat merah* vocant, sed ad Brisu *Samak pulut.*

It is to be enquired if **Haemocharis marginata** (Korth.) O. Kuntze, is not of this affinity. Its leaves are described as oblong-oval or oblong-obovate and though put into *Closaschima* by the author the style is described by him as “5-angled, 5-grooved, silky and short” which fits such an admitted *Gordonia* as *G. singaporiana* excellently. It was obtained from Mt. Tirin and from Matapura in Borneo.

Haemocharis subintegerrima, has leaves lanceolate oblong to obovate oblong. As in the case of the above the mention of obovateness suggests a place near to *Gordonia concentricicatrix* but its veins are obscured, and the marginal teeth nearly

obsolete. Kurz says that it hardly differs from *H. aromatica,* and is the same as *Gordonia Maingayi,* which appears dubious. It was obtained in Sumatra at Kobu-lahat in the Province of Palembang.

G. multinervis, *King,* in Journ. Asiatic Soc. Bengal, lix, 1890, p. 205, ends the series to which it belongs, being peculiar in the great size of its leaves. It has been collected in Perak and in Singapore. As the attached figure shows the veins in the leaf-blade are not inconspicuous, a feature shared with *G. concentricicatrix.* The flowers are only a little over 2 cm. in diameter and agree with those of *G. concentricicatrix.* Sir George King called attention to the resemblance of its leaves to those of the genus *Pyrenaria.*

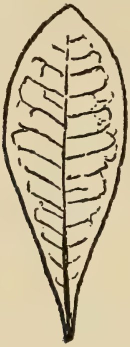


Fig. 11. A leaf of *G. multinervis,* reduced to $\frac{1}{5}$, from Ridley 6367

G. singaporiana, *Wallich,* Cat. Lith., 1832, No. 1457, name only; Ridley in Journ. Straits Branch, Roy. Asiatic Soc., No. 73, 1916, p. 141: *G. excelsa,* var. *sincapuriana,* Dyer in Hooker fil., Flora Brit. Ind. i. 1872, p. 291: *G. grandis,* King, in Journ. Asiatic Soc. Bengal, lix, 1890, p. 203, non André. In this species the petiole is almost absent, and the leaf blade very nearly entire. In its subsessile leaves it is easily distinguished from all other Malayan species, but in Ceylon we find allied trees with such leaves. The flowers which are 3 cm. across, have been figured above (p. 133), and the ovary with its abbreviated style (p. 140); the leaf and a capsule are figured below. Kurz saw that it is not Blume's plant, but misidentified it with *Gordonia axillaris.*

It occurs in Singapore island, in Johore, in Malacca, and in Penang.

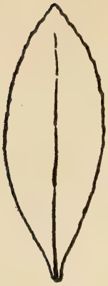


Fig. 12. A leaf of *G. singaporiana* reduced to $\frac{1}{5}$.

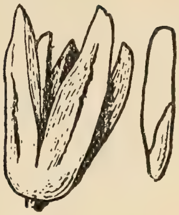


Fig. 13. A capsule of *G. singaporiana* and a seed from life, nat. size.

G. dipterosperma, *Kurz,* in Journ. Asiatic Soc. Bengal, xlv, 1876, p. 119: *G. excelsa* var. *pubescens,* Dyer in Hooker fil., Flora Brit. India, i. 1873, p. 291: *Gordonia sp.,* Griffith, Posthumous-papers, ii. p. 99 and iii, p. 200: *Dipterosperma sp.,* Griffith, Notulae, iv. 1854, p. 564.

It appears right to separate this from *G. excelsa,* as Kurz did. Kurz wrote "Blume's tree differs so much from the above in the long peduncles, large hirsute capsules, and in the texture and pubescence of the leaves, that it is difficult to understand how it could have come to be identified with the Khasi and Sikkim tree." Ridley (in this Journal No. 73, p. 142) has called attention to the large pustules from which the hairs spring on the backs of the leaves. It was collected first by Griffith at Dewangiri where he entered what is now Bhutan, and then afterwards in the Khasi hills by Kurz. Mr. C. C. Calder, Curator of the Herbarium of the Royal Botanic Gardens, Calcutta, has been so good as to refer to all the material that he possesses and to tell me that it has been obtained in additional localities in British Sikkim.

G. excelsa, *Blume,* Bijdragen, iii. 1826, p. 130: Koorders and Valeton in Mededeelingen 'SLands Plantentuin, No. 16, 1896, p. 289: Koorders, Excursionsflora von Java, ii. 1912, p. 608: Koorders-Schumacher, Systemat. Verzeichnis, fam. 180, p. 35. *Antheeischima excelsa,* Korthals, Verh. Nat. Gesch. 1839-42, 138, t. 27.

Koorders points out that the margin of the leaves varies considerably, being toothed sometimes and sometimes not toothed. The flowers, Ridley points out, are twice as large as those of *G. singaporiana.* Koorders describes the appearance of the tree as characteristic, the young stem up to 50 cm. in diameter having a peculiar thin sloughing "brown-red-grey" bark. *G. excelsa* was obtained by Blume in the mountains of Western Java; it was obtained by Koorders on Gunong Salak in Western Java and in the Pantjur-Idjen region of East Java.

G. zeylanica, *Wight,* Illustr., i. 1840, 99: Thwaites, Enum. Florae Zeylan. 1864, p. 40: Dyer in Hooker fil., Flora Brit. India, i. 1873, p. 291: Trimen, Handbook Flora Ceylon, i. 1893, p. 110.

The almost sessile oval or oblong lanceolate leaves of this species distinctly suggest *G. singaporiana,* but they are shorter, firmer and the margins are markedly revolute often. Its white flowers are large, being 7.5 cm. in diameter. The capsules are rather over 3 cm. long. It occurs in many places about the mountains in the centre of Ceylon between 4,000 and 7,000 feet.

G. elliptica, Gardner, in Calcutta, Journ. Nat. Hist., vii. 1846, p. 448, is regarded by Trimen as a variety of *G. zeylanica* with shorter leaves and larger flowers. It occurs at one place in the same region as *G. zeylanica.*

G. speciosa, *Choisy* in Mémoires de la Société Physique de Genève, xiv. 1855, p. 52: Thwaites, Enum. Florae Zeylan., 1864, p. 40: Dyer in Hooker fil., Flora Brit. India, i. 1873, p. 292: Trimen, Handbook Flora Ceylon, i. 1895, p. 111. *Carria speciosa,* Gardner in Calcutta Journ. Nat. Hist., vii, 1846, p. 7.

By its large deep crimson flowers this is a most outstanding species. Its long ovate leaves are almost sessile or even sessile: they are entire and the margin often revolute. The flowers are nearly 10 cm. in diameter, and its capsules nearly 5 cm. long. The stamens are united into five groups.

It formerly occurred gregariously in the forest above Rambodde in Ceylon at about 4,000 feet, where clearing has been extensive and made it very rare.

G. Lobbii, *Hooker fil.,* in Trans. Linn. Soc. London, xxiii, 1860, p. 162, may be taken conveniently as the first of the last group of the genus, a group made of species with relatively small leaves whose margins are even and whose general facies suggests ability to withstand adverse conditions. It is a small or medium sized tree, with elliptic harsh entire leaves attaining 9 cm. in length, and 5 cm. in width. The expanded flower is only 2 cm. in diameter. The ovary is described as globose. It was collected by Lobb "ad Sarawak" which would mean near Kuching.

G. Havilandii, a new species, comes very near to *G. Lobbii,* and was obtained near Kuching. It differs in its petioles and its filaments, points which on further study may be found perhaps not worthy of the stress laid on them here. But until we have obtained the material needed for bridging the differences, they must be recognised.

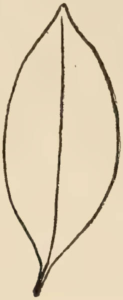


Figure 14. A leaf of *G. Havilandii* reduced to ¼ from Haviland 67.

Gordonia Havilandii. *Frutex* vel arbor, cortice ramulorum avellaneus. Ramuli ultimi 3 mm. diametro. *Folia* exacte elliptica, basi fere subacuta vel obtusa, apice aequaliter rotundata vel obtusa ad acumen breve obtusum, crasse pergamentacea, margine laevi decurvo, glaberrima, ad 12 cm. longa, ad 6 cm. lata: *Sepala* dense flavo-sericea, ad 1 cm. longa. *Petala* dorso dense flavo-sericea, 1.5 ad 1.8 cm. longa. *Antherae* numerosissimae, versatiles, 2 mm. longae: filamenta basin versus pubescentia, 1 cm. longa, discrete cum petalis inserta. *Ovarium* subglobosum, sericeum, in stylo 8 mm. longo gradatim protensum. *Capsula* immatura 1.5 cm. longa visa, matura ignota.

BORNEO. In Statu Sarawak, monte Serapi, 2800 ped. alt. collegit Haviland sub numero 67, etiamque ad 3000 ped. alt. sine numero, etiamque in monte Singpi mense Decembri cum floribus sub numero 1995.

Haemocharis vulcanica, *O. Kuntze,* is described as if extremely like the last two species. It has oval or ovate-entire leaves of a similar size. But the description states that the stamens are sometimes in five groups, as in *G. speciosa* and the American *G. Lasianthus.* The ovary is described as ovoid which indicates a narrowing upwards to the five subconnate styles. Surely it is a good *Gordonia!* It was obtained on Mount Merapi in Sumatra.

G. imbricata, *King,* in Journ. Asiatic Soc. Bengal, lix, 1890, p. 204, has a distinctly zerophytic appearance. Two flushes of its foliage are figured below. The leaves are seen to be small and entire. They are harsh and thick with the margins slightly revolute. The flowers are only 2.5 cm. in diameter. The ovary narrows into the style. It occurs on the mountains of Pahang, both on Gunong Tahan and Gunong Benom at Kluang Terbang.

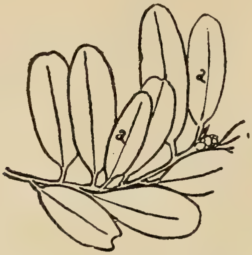


Figure 15. A branch of *G. imbricata* showing two flushes, a. a. the periodic reduced leaves, reduced to ¼ from Ridley, 16021.

G. Scortechinii, *King,* in Journ. Asiatic Soc., Bengal, lix, 1890, p. 24, might be described as *G. imbricata* with an admixture of *G. Maingayi.* Its branches however are more slender than in the first of these two and its flowers are recorded as remarkably small, the stamens being no more than 30. The locality whence it was obtained is unrecorded except as "Perak."

G. brevifolia, *Hooker fil.,* in Trans. Linn. Soc. London, xxiii, 1860, p. 162, is obviously a close ally of the last two. Its leaves are broadly ovate to obovate, with the condition of the apex varying. Its flowers are large, being nearly 4 cm. across. It was obtained on Mount Kinabalu in Borneo at about 8,000 feet.

Haemocharis buxifolia, *Szyszylowicz,* appears to be one of this set of Gordonias, and the type specimen should be re-examined with this view. It was obtained in western Sumatra at Paya Komba.

Haemocharis ovalis, (Korth.) *O. Kuntze,* is the only species of which it is clearly said that the style is indistinguishable: "Stylus haud manifestus" are Korthals words: which together with his further statement "ovarium ovoideum, apice truncatum" do indicate such a condition as is in the American *Haemocharis.*

On this account I do not attempt to find a place for it among the species of *Gordonia,* but put it at the end. Its leaves are described as much smaller than the species around *G. luzonica* (7 cm. long by 2 cm. broad); but they are serrulate or crenate, and therefore not as those ending the series such as *G. imbricata.*

It was obtained in the forests of Melintang in Sumatra.

No attempt is possible at placing **Haemocharis amboinensis.**

Outstanding features in the genus are:—

i. the septifragal capsule of *G. pubescens.*

ii. the wingless seeds of *G. pubescens.*

iii. the deep crimson colour of the flowers of *G. speciosa.*

iv. the union of the filaments into five groups in *G. Lasianthus* and in *G. speciosa; Haemocharis vulcanica* is said sometimes to exhibit this.

v. the reduction of the number of the carpels sometimes in *G. axillaris* and in *G. Balansae*: and also in *G. obtusa.*

vi. the distinctness of the veins in the two American species and in *G. sinensis.*

vii. the obovate shape of the leaf in *G. concentricicatrix* and *G. multinervis,* with a moderate distinctness of the veins.

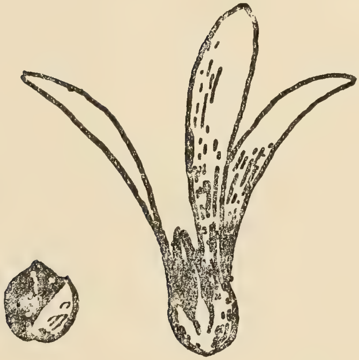
viii. the slenderness of the branchlets in *G. penangensis* and *G. Maingayi.*

ix. the development of a montane small leaved type in the Malay Peninsula, Borneo, and apparently in Sumatra.

Notes on Dipterocarps.

No. 2, The Seedling and the Seed-production in some species of Shorea.

BY I. H. BURKILL.



Fruit of *Shorea leprosula*, slightly reduced : and the dehisced capsule showing the sterilised loculi forming a partial septum intruding into the fertile loculus.

The ovary of Shorea has three loculi, and in each loculus are two ovules. But of the six thus presented in each flower, usually one only matures into a seed. As this one grows, it with its loculus extends round the central placentas, ending in wrapping within itself the two sterilised loculi. At seed-fall all endosperm has gone, and it is the fleshy inner cotyledon which does this wrapping. The radicle of the embryo is directed towards the apex of the loculus. Figure 2 is the embryo of *Shorea leprosula,* Miq., seen from the basal end of the loculus, showing how the two cotyledons lie doubled round the placentas (pl.) one being outside the other.

The figures here reproduced have all been drawn with the aid of a camera, and are proportionately accurate.

Jour. Straits Branch R. A. Soc., No. 76, 1917.

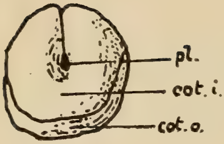
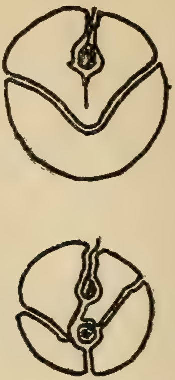


Figure 2. The embryo × 3 (from the basal end of the fruit :) *pl.* placenta ; *cot. i.* inner cotyledon : *cot. o.* outer cotyledon.



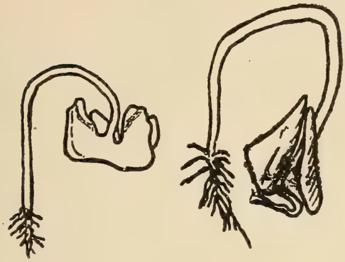
Figs. 3 and 4. Fig. 3 (above) the embryo is section near the rounded end of the seed: Fig. 4, (below) the same toward the pointed end.

The outer cotyledon (cot. o.) when seen from this point of view, appears to be very much less bulky than the inner and is indeed a little less bulky. Each is two-lobed (see fig. 8), these lobes being packed in the seed in the upper half of the loculus, where they surround the radicle.

On cutting the embryo transversely near to the end which is represented in figure 2, the two cotyledons are seen doubled round the placenta as in figure 3. But when we take a transverse section towards the other end, we get their lobes in section surrounding the radicle and hypocotyl as in figure 4, the two lobes of the inner cotyledon embracing the placenta.

At maturity when the shuttle-cock-like seed falls, spinning into the sparse herbage and leaves on the floor of the forest, the embryo plant is full of chlorophyll and in such a state that it must germinate without delay or die. By reason of the way in which it falls, there is a considerable probability that it comes to rest with the radicle directed upper-most, and a certainty that it will not be directed downwards. The seed germinates; the cotyledons by growth and in straightening themselves rupture the thin ovary wall and seed coats, not along two constant lines but along two lines from top to base on opposite sides, generally rather more than 180° removed from each other on the side of the partial septum, so that this portion of the husk is rather larger than the other: then the hypocotyl elongates and curves to direct the radicle into the soil (fig. 5) ; if the radicle succeeds in anchoring, a tendency in the hypocotyl to straighten itself which now succeeds to the other, pulls the cotyledons from the loosely imprisoning fruit-walls, and the stage which is seen in figure 6 passes over to that seen in figure 7. If there happens a most unlikely occurrence in nature,—that the cotyledons cannot be pulled out, and the root does not hold, the latter by the straightening of the hypocotyl is raised up into the air, and held.

The cotyledons at this time move so as to become nearly horizontal and stand thus unless as not seldom happens their lobes engage, when they remain face to face as figure 6 indicates.



Figs. 5 and 6, *Shorea leprosula* the root being placed in the earth.

A glance at figure 4 shows than any impression of the placentas will be on the lower surface of the inner cotyledon only, but that impressions of the radicle may be on the lobes of both. In figure 5 the impression of the placentas is seen crossing the lobes of the inner cotyledon: and in figure 8 the impression of the radicle may be observed.

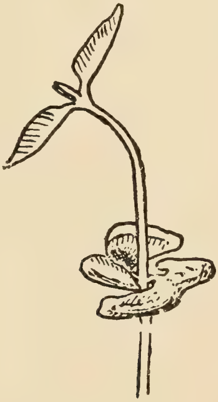
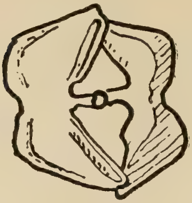


Fig. 7. *Shorea leprosula*, reduced to ½, at the expanding of the first leaves,

Figure 6 shows that the outer cotyledon retains more of its humped shape than does the inner cotyledon: and it is the straightening of the inner cotyledon which more than anything else appears to burst the fruit wall,—an interesting slight differentiation of function.

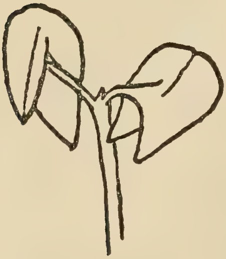
Fig. 8. The cotyledons of *Shorea leprosula* from above, × 1½.



At the stage reached in figure 7 the first pair of leaves are ready to expand: and at this stage the heliotropism exhibited by the young plant is considerable. The plant figured had been illuminated from one side only.

It will be noticed in figure 7 that one cotyledon is raised by its petiole to a position slightly higher than that of the other; that one is the outer: and the different angle which it tends to take, may be connected with its greater bulk and less ability to flatten itself. The outer cotyledon stands higher than the inner also in other Shoreas.

Figure 9 is of *S. rigida,* Brandis, with the outer cotyledon to the left. Figs. 10 and 11 are of *S. macroptera,* Dyer, with the same orientation. Figure 12 is of *S. bracteolata,* Dyer, with the outer cotyledon on the opposite side. In all the outer cotyledon has taken up a position above the inner.



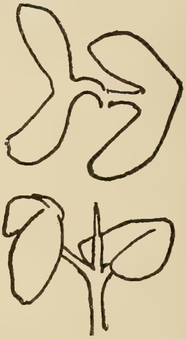


Fig. 9. Cotyledons of *Shorea rigida*. **Fig. 10.** Cotyledons of *Shorea macroptera* from above and from the side.

This outer cotyledon is least bulky in *S. bracteolata,* and most bulky in *S. macroptera.* The drawings indicate differences in shape: but until many more Shoreas have been examined in the seedling state, it is useless to endeavour to establish relationships between their shape and the sections of the genus.

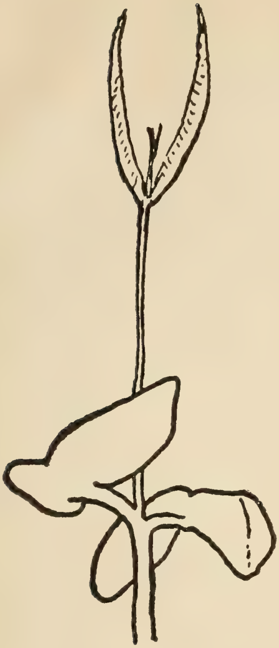


Fig. 11. A young plant of *Shorea macroptera* at the expanding of the first leaves.

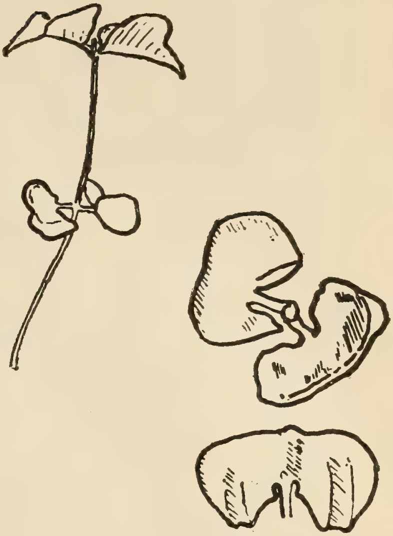


Fig. 12. A young plant of *Shorea bracteolata* and its cotyledons, both from above and the inner from below.

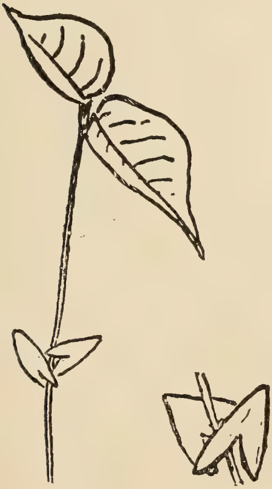


Fig. 13. A young plant of *Shorea gibbosa*.

All of these Shoreas, *e.g. S . leprosula, S. rigida, S. macroptera*, and *S. bracteolata*, have epigeal cotyledons with short petioles; but the Indian *S. robusta*, Roxb., differs greatly from them in having cotyledons capable of being hypogeal, with greatly elongating petioles, in which characters it approaches *Dipterocarpus*.

In the Botanic Gardens, Singapore, where *S. macroptera* is particularly abundant, many abnormal seedlings appeared in 1916. Some of these had three cotyledons, followed by three leaves in a whorl: some had three cotyledons followed by what may be called two and a half leaves (fig. 15) or by three and a half leaves (figure 16); and sometimes abnormally split leaves would follow the normal number of cotyledons (fig. 17). Notice was particularly taken of these in the wish to ascertain how *Anisoptera* (see this Journal p. 44) has a whorl of four leaves following the cotyledons.

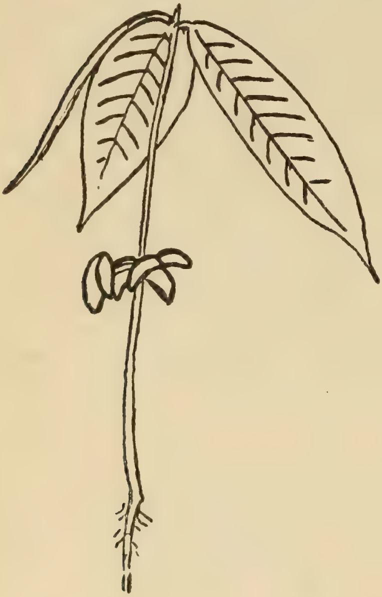


Fig. 14.

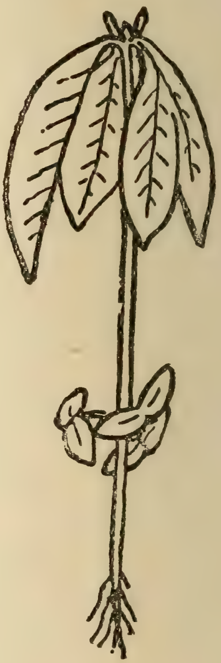


Fig. 16.

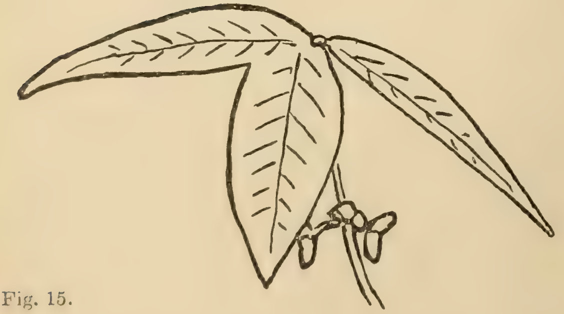


Fig. 15.

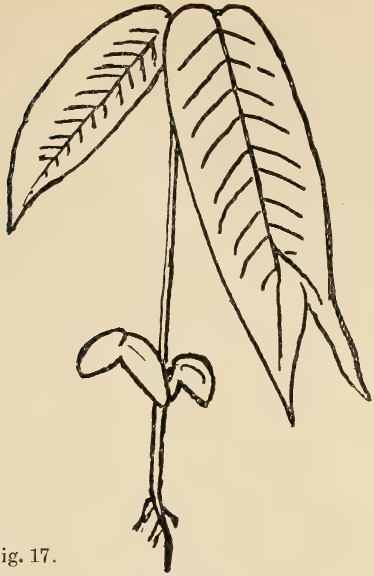


Fig. 17.

Figs. 14, 15, 16, 17. Abnormal seedlings of *Shorea macroptera.*

The period from flowering to seed fall in the Shoreas, all except *S. bracteolata* being wild in the Botanic gardens, is about ten weeks in the case of *S. leprosula, S. rigida, S. macroptera* and *S. pauciflora*, about nine weeks in the case of *S. bracteolata* and *S. gibbosa.*

S. gratissima, Dyer, which in addition to those just named also occurs wild in the Botanic gardens, flowered in 1915 in three trees, at some little distance from each other, one being in area N. (No. 1239) the second in area U (No. 1237), and the third in area V (No. 1238); and it did not flower along with all the other species in 1916. But apparently it has flowered on earlier occasions at the same time as other species, and probably the conditions which lead to the flowering of all are very similar. One tree of *S. leprosula* which had not flowered in 1916, a young tree, flowered in 1917: clearing had been done round it in 1916 and it had received some injury during the work. There was consequently in its case a change of conditions which might account for the flowering. In the case of all the species, such records as exist in the Singapore herbarium suggest that flowering occurs in the first suitable season after three years have elapsed from the last heavy seed-crop.

In India *S. robusta* flowers in almost every year, but on the average one year in three only is a year of good seed.

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The Advent of Muhammadanism in the Malay Peninsula and Archipelago.

BY R. O. WINSTEDT.

Muhammad died in 632 A.D. By the year 915 A.D. Arab traders had voyaged to Kedah, and it is related[1] that they found there a large and important port for trade. It is highly improbable that they made many converts; but undoubtedly some of them married native wives and Muhammadanism must have made headway in the port itself.

In 1292 A.D. Marco Polo visited Sumatra. He relates how he found Muhammadans in the port of Perlak, but that the people of Samudra[2] and Pasai were still heathen. In Marco Polo's day Kedah had fallen from its previous estate as a trading port and Pasai had taken its place. The *Hikayat Raja-Raja Pasai* (*J. R. A. S., S. B., No. 66, pp. 9-15*) gives a story of Merah Silu ruler of Pasai marrying a daughter of the ruler of Muhammadan Perlak and taking the title of Sultan Maliku's-Salleh on his conversion to Muhammadanism; and this story is corroborated in the seventh chapter of the *Sĕjarah Mĕlayu.* Sultan Maliku's-Salleh died in 1297 A.D. At that time Pasai was the chief trading port in these seas.

To this day are preserved Muhammadan tomb-stones at Pasai, dated 1407 A.D. They have been identified by a Dutch archaeologist[3] as coming from Cambay in India: and they bear the closest resemblance to tomb-stones at Grisek in Java and at Bruas, the site of an old Malay kingdom between Perak and the Dindings. Of course, the early missionaries were not only Arabs but Indians from Gujerat and Malabar or Kalinga as it was then called. And the *Sĕjarah Mĕlayu* furnishes confirmatory evidence of the custom of bringing tomb-stones from India to Malayan countries (Chapter VII).

The *Sĕjarah Mĕlayu* records (Chapters XX and XXXII) how there was constant intercourse between Pasai and Malacca. In his "Commentaries," Affonso d' Albuquerque gives a native tradition that Iskandar Shah of Malacca married a princess from Muhammadan Pasai. The Chinese records chronicle that the Malays of Malacca had become Muhammadans by the year 1409 A.D. Anyhow all tradition describes Sultan Muhammad Shah as the first Muhammadan prince of Malacca. That prince ascended the throne in 1403 A.D. and died in 1414 A.D. In that century Malacca succeeded Pasai, as Pasai formerly had succeeded Kedah, as the chief centre of sea-trade. The port of Malacca was filled with foreigners, Arabs, Indians, Javanese, missionaries, traders, mahouts and so on. And the path of the Muhammadan missionary was still hard. Witness some of the stories told against him in the *Sĕjarah Mĕlayu*:

---

[1] "Cathay and the way thither," Col. H. Yule, C.B. (London, Hakluyt Society, 1866).

[2] In 1346 Ibn Batuta found the king of Samudra an ardent Moslem.

[3] "De grafsteenen te Pasé en Grissee vergeleken met dergelijke monumenten uit Hindoestan" by J. P. Magnette, Tijd. Bat. Gen. LIX (1912), p. 536 and p. 208.

"A boat came from Jeddah to Malacca. In it was a man of great religious learning, by name Maulana Sadar Jahan. Sultan Mahmud Shah became his pupil and ordered his son Raja Ahmad also to take lessons. One night the Bendahara Sri Maharaja sat discussing religion with the missionary, when Sri Rama a confirmed drinker entered the worse for liquor. The Sultan bade his servants bring food for Sri Rama; and they brought it in a silver bowl, covered with an embroidered cloth. Sri Rama saw the Bendahara Sri Maharaja talking with the Arab teacher, and remarked, 'Come on, I'll have a lesson too.' The Bendahara invited him to be seated. Sadar Jahan saw that Sri Rama was drunk and noticed that his breath smelt of spirits: so he observed in Arabic, 'Drink is the mother of all beastliness.' Sri Rama retorted, 'Covetousness is the mother of all beastliness, and you came here in search of profit.' The missionary was exceedingly wroth and went home, refusing all efforts of the Bendahara to detain him."

And again:—

"Tun Mai, whose nickname was The Hairy Caterpillar, took lessons from the Arab teacher. He was not apt at learning, because it is hard for a Malay to pronounce harsh Arabic sounds. So the teacher was upset and remarked, 'Your pronunciation is very bad; I make one sound and you another.' Quoth Tun Mai, 'Yes, I find it very hard to pronounce Arabic, as it is not my own language. If you talked Malay, you would be in a similar case.' The teacher replied, 'What difficulty is there in the pronunciation of Malay that I cannot master.' Quoth Tun Mai, 'Say *kuching*.' The Arab said '*Kusing*.' Quoth Tun Mai, 'Wrong! Say *kunyit*.' The Arab said '*Kuzit*.' 'Say *nyiru*.' The Arab said *niru*. Said Tun Mai the Hairy Caterpillar, 'A pretty notion you have of pronouncing Malay! Just like my notion of pronouncing Arabic.' Then Sadar Jahan was exceedingly angry and declared, 'Never again will I give lessons to Tun Mai the Hairy Caterpillar.'"

All sorts of merchandise came to Malay ports like Malacca from Arabia, India, Persia; and references to such novelties are frequent in Malay folk-tales, the *Ht. Awang Sulong*, the *Ht. Sĕri Rama* and so on:—

Baju-nya bĕlĕdu ainu'l-banat..........
Kain-nya kain Bugis Kĕmbayat..........
Kĕris-nya sĕmpana ganja iras,
Kĕratan tongkat nabi Adam,
Sĕrpai bĕsi Khĕrsani..........
Di-pakai jubah khasah halus,
Jubah mĕleret sampai ka-kaki;
Sĕrban Kashmiri warna hijau,
Buatan Arab di-nĕgĕri Mĕkkah..........
Kĕris sĕmpana ganja iras
Pamur janji di-tĕngah
Pamur jilallah di-tuntong,
Pamur alif tĕrdiri sĕndiri-nya;
Bukan-nya bĕsi sa-barang bĕsi.
Bĕsi lĕbeh pĕnganching kaabah Allah.

Cambay, Khorassan, Kashmir, Mecca were all familiar names to these Malay buyers of foreign merchandise.

Sultan Mansur Shah, who died in 1475 A.D., conquered Pahang Kampar and Indragiri and introduced Muhammadanism into those countries. His tomb-stone beautifully carved, with an inscription in Arabic, lies now in two fragments outside the front door of the Residency at Malacca. Certainly it was no Malay craftsman who did the lettering.

This tomb-stone of Sultan Mansur Shah, if the date has been correctly deciphered as 880 A.H., is a few years later than that of the Muhammadan saint at Pangkalan Kĕmpas. The Indian lettering on the Pangkalan Kĕmpas stone has never been deciphered; but the Malay inscription in Arabic lettering, evidently done locally and by an amateur carver, records that it marks the grave of one Shaikh Ahmad Makhtar Ramali ibni Marfu Talani and was erected in A.H. 872 (corresponding to 1467 A.D.) "in the reign of Sultan Shah Mansur." It is possible that parts of the Shaikh's tomb were constructed locally and that other parts, like the ornate so-called "Sword," were brought from India, as we have seen was a common custom. The word "Allah" stands carved in high relief on the "Sword," so that one may surmise it is a genuine Muhammadan relic, and not a Hindu stone adapted for a Muhammadan shrine, as might be contended if "Allah" were cut into the surface of the stone; a word in high relief must almost certainly form part of the original ornamentation. It shows the interest that has been taken in our few archaeological remains, when as late as 1910 a keen enquirer like the late Mr. Barnes could write of the tombstone of Raja Fatimah of Pahang, which is dated A.H. 901 = A.D. 1496, as "the oldest dated grave-stone in the Peninsula"! (*J. R. A. S., S. B. No. 60, pp. 37-39*). Like Sultan Mansur's tomb-stone Raja Fatimah's stone has an inscription in the Arabic language and the lettering too is not amateurish but less fine perhaps than that on the Sultan's.

Unless the author of the *Sĕjarah Mĕlayu* has been guilty of anachronism Malay translations of the Muhammadan stories of Hanafiah and Amir Hamza were classics by the year 1511 A.D. and Malacca's warriors read them on the eve of the Portuguese attack which was to break Malay power in Malacca. Anyhow they were classics by 1616 A.D., the date of the *Sĕjarah Mĕlayu.*

The last Malay ruler of Malacca became the first ruler of Johor. By him and his descendants Muhammadanism was introduced into Johor, Riau and Lingga.

But after the fall of Malacca, Acheen became the centre of native trade and of the Muhammadan religion. In 1524 A.D. Sultan Ibrahim of Acheen conquered Pidië and Pasir. From 1606 till 1636 A.D. Acheen was ruled by Sultan Iskandar Muda, called Mahkota Alam. By him were conquered Indrapura, Deli, Siak, Johor, Kedah and Perak. In his reign all sorts of books were written in Malay or translated from the Arabic into Malay at Acheen; for instance, the *Sĕjarah Mĕlayu* and the *Bustanu's-salatin.* The *Bustanu's-salatin* was written by Shaikh Nuru' d-din of Gujerat. This Shaikh Nuru'd-din Muhammad Jilani ibni Ali ibni Hasanji ibni Muhammad Hamid a'r-Raniri also did into Malay the religious work, the *Siratu'l-mustakim* in the year 1634 A.D. Our *Kedah Annals,* the *Hikayat Marong Mahawangsa,* relate (*J. R. A. S., S. B., No. 72, p. 115*), how the king of Acheen and Shaikh Nuru'd-din sent letters and copies of the *Babu'l-nikah* and *Siratu'l-mustakim* to the raja of Kedah on the occasion of his country's conversion to Islam:—a story which, as Mr. Blagden has pointed out, helps to fix the date of the *Kedah Annals.* The Achinese account gives 1474 A.D. as the date of Kedah's acceptance of Muhammadanism; and the *Sĕjarah Mĕlayu* relates that a raja of Kedah went to Malacca to receive recognition as ruler from the king of Malacca, a Muhammadan prince: so that it is probable that Muhammadanism had been accepted at the Kedah court in the XVth century, though the conquest of Kedah by Acheen may have given it a fillip in the XVIIth century. Possibly conquest by Acheen stimulated Muhammadan influence in Perak too. Anyhow in the XVIIth and XVIIIth centuries Sayids of the great Hadthramast house of Ahmad bin Isa al-Mohajir[1] (*Paper on Malay Subjects, Law Part II, pp. 1-7, R. J. Wilkinson*) gained enormous power at the Perak court.

As for the spread of Islam in Sumatra. From Acheen it spread to Ulakan; from Ulakan into Minangkabau:—*Ulakan sĕrambi Acheh, Acheh sĕrambi Mĕkkah.* In the XVIIth century the people along the coast of the Lampong district began to be converted, and in the XVIIIth the people up-country too.

In Java, early centres of Muhammadan influence were Grisek Surabaya and Madura.

---

[1] This family will form the subject of a later paper.

The first Arab missionary to Java was Maulana Malik Ibrahim, who came to Grisek and lived there till he died in 1419 A.D. Sĕdayu, Tuban, Japara, and Demak soon became Muhammadan. In 1478 A.D. the Muhammadan princes of Java overthrew the old great Hindu kingdom of Majapahit. The ruler of Demak seized the regalia and proclaimed himself Sultan, and he and his descendants drove Hinduism to take refuge in Blambangan and Bali. The fall of Majapahit released its dependencies Palembang, Jambi and Inderagiri, and in those countries too Muhammadanism gained ground.

At the time of the fall of Majapahit there was an Arab missionary Shaikh Nuru'd-din Ibrahim bin Maulana Israil, or Sunan Jati as he styled himself, who lived at Jati near Cheribon. He and his family gained great power. Cheribon came to be governed by this Shaikh Nuru'd-din; Jakarta, or the district of Batavia, by one of his sons and Bantam by Hasanu'd-din another of his sons.

In the middle of the XVIth century a missionary went from Palembang to Borneo and made converts first at Sukadana and at Madan.

In 1606 A.D. a Minangkabau trader converted the raja of Pallo in the Celebes; and soon the people of Boni and Lui also became Muhammadans.

At the end of the XVth century the princes of Ternate and Tidor in the Moluccas and the people of Amboyna became Muhammadan.

Study of the genealogies of the ruling families of Sumatra, Java, Borneo, and even Mindanao (*Studies in Moro History, Law and Religion*, *N. M. Saleeby*) will throw still more light on the spread of this one of the world's great religions among the heathen peoples of the Malay archipelago.

An account of the conversion of the Malayan races of the archipelago is given in vol. II of the *Encyclopaedie van Nederlandsch-Indië* under the caption "Mohammedanisme," but chronological points have been further corrected by B. J. O. Schriéke in *Het Boek van Bonang*, Utrecht, 1916. An account of the early Muhammadan missionaries to Acheen is to be found in the *Bustanu's-salatin*, in the fragment published by Niemann in his *Bloemlezing uit Maleische geschriften*: Snouck Hurgronje's *The Achinese*, Vol. II, pp. 10-20 contains an authoritative summary of their doctrines. Van der Tuuk's "Account of the Malay MSS. belonging to the Royal Asiatic Society" gives a catalogue of the works composed by the author of the *Bustanu's-salatin*, and by the pantheists Hamzah of Barus and Shamsu'd-din of Pasai (*Essays relating to Indo-China*, vol. II, pp. 49-52). D. A. Rinkes has written a brochure entitled *Abdoerraof van Singkel*, (Friesland) being a study of Muhammadan mysticism in Java and Sumatra and containing a useful bibliography.

Memorandum, on the Aborigines in the Jasin District of Malacca, dated 1892.

By C. O. Blagden.

[This memorandum is taken from an official file in the records at Malacca, where it attracted the attention of Mr. L. E. Pipe Wolferstan, the Resident. At his suggestion, and with the consent of the Colonial Government, and also after submission to the author, it is published here that such valuable information may not be altogether lost sight of.] Hon. Sec.

The non-Muhammadan aborigines in the Jasin district are commonly known to the Malays as Orang bukit, Orang utan or (very generally) Orang rayat.* They belong according to their own account to three principal tribes, viz: the Mĕntĕra, Jakun and Bĕsisi, although individuals of other tribes *e.g.* the Kenaboi are occasionally met with. The Mĕntĕra say that they themselves are the real Malacca aborigines and that the true habitat of the Jakun is Johor and of the Bĕsisi Sungai Ujong and Selangor. The Mĕntĕra also consider themselves very superior to the Jakun; they claim the tribal name of Biduanda in common with the Muhammadan clan of that name, and the Malays freely admit the fact of their own descent from the Biduanda tribe of the Mĕntĕra and style the Mĕntĕra *Bangsa tinggi* as opposed to the *Bangsa rĕndah* or lower caste of Jakun. The latter are distinctly on a lower scale of civilisation: they plant less than the Mĕntĕra and depend more on the chase; it is said that they freely eat animals that have died a natural death, even if in an advanced stage of decomposition, and certainly their huts are smaller, ruder, and of a more temporary make-shift appearance than those of the Mĕntĕra, and their settlements are not so permanent.

The Bĕsisi as their language shows, are a Sakai tribe akin to those of the centre of the Peninsula and look upon the Mĕntĕra and Jakun as strangers calling them Landas or Bĕlandas and professing not to understand their language which is indeed altogether different.

The Mĕntĕra and Jakun at this date (1892) speak dialects which, whatever their original character, are so deeply impregnated with Malay that they are little better than Malay pâtois, though their pronunciation is so peculiar that they are not understood by Malays. That of the Mĕntĕra approximates closest to the ordinary Malay of their Muhammadan neighbours, while the Jakun dialect seems to retain more of its original character. The two appear to be closely connected, and frequently agree together while differing from the Malay, but as often as not Mĕntĕra agrees with Malay and differs from Jakun, while in a few cases all three diverge. The Mĕntĕra although they rather despise the Jakun have intermarried a good deal with them and it is almost impossible at present to keep the two dialects entirely apart: if a Mĕntĕra is asked for the Mĕntĕra equivalent of a Jakun word he usually lapses into Malay. On the other hand a good many words differ in the two dialects, but as they are generally understood fairly well by persons of both tribes, each being usually fairly conversant with the dialect of the other as well as its own, it is very difficult to ascertain accurately the points in which these two dialects differ from each other.

---

* This term is never by the Jasin Malays used with reference to themselves except in direct opposition to the word raja.

The general physical type of these aborigines is Malayan, but there are a variety of points in which they usually differ more or less from the normal Malay type; and it is almost always possible to recognize an Orang utan by his features even if he be dressed in the Malay style. Some individuals approximate very closely to the common Malay type: others present an appearance as if there had been a strong admixture of low caste Kling or Negro blood, the complexion being darker and the features coarser than in the Malay. This is more particularly the case in the Jakun who is usually of a distinctly lower type than the Mĕntĕra.

Speaking generally in the average type of Malacca Orang utan the nose projects more than in the Malay and the prognathism is more pronounced. The upper lip is thicker and more projecting and the chin tends rather to recede, the lower lip hanging somewhat as compared with Malays.

The eye is somewhat different in expression from that of the Malay, but it is hard to describe the precise nature of the difference, though when once seen it is easily recognised.

The hair which is often worn long by the men is almost always wavy and sometimes quite curly; it is always black, except when grizzled by age, and in young children when it has a brownish tinge.

The face hair is scanty, as also is the hair on the body. The height varies a good deal but the average is probably somewhat less than among Malays. The legs and arms are often thin, but in some individuals they are well developed and muscular.

The aborigines, as has been mentioned already, differ somewhat amongst themselves in respect of their social habits. The Mĕntĕra usually live in fairly good houses surrounded by a small plantation of yams, sugar-cane, papayas, maize and sometimes either hill or swamp-padi according to the situation. Occasionally they plant coconuts. They hunt all manner of animals, principally monkeys and squirrels for food, and many of them have guns though they still use the sumpitan on occasions. Their houses are small but constructed something like those of Malays and roofed with wild atap.

Each settlement is a sort of society by itself and the principal inhabitant usually bears the title of *Pĕnglima.* Monogamy appears to be the usual practice, but in some cases a man has two wives. Marriages take place soon after the age of puberty in the case of girls and do not apparently involve any particular ceremony beyond cohabitation, although sometimes a feast is made. Funerals also involve no special ceremony. According to their own account no religious ceremonial at all is practised by the Orang utan and they profess no sort of acquaintance with any deity though they believe in the existence of malignant spirits and especially in the ghosts of the dead. It is out of fear of the latter that they make a practice of shifting their settlement after a funeral.

Many of the Orang utan have become christianised by the French Mission, but it may be doubted whether their new religion is ever very clearly understood by them. It has however undoubtedly contributed to raise them in the social scale, and their standard of comfort is certainly higher than it used to be, according to the description given in the Hikayat Abdullah and other works, some decades ago. Even those who remain heathen or have relapsed into heathenism seem to have shared in the material improvement consequent on the attempt to convert them.

The number of aborigines in this district according to the Census of 1891 was only 77, but there is no doubt that this was an understatement and I should think that there are probably nearly double as many. A list of their settlements as far as is known to me is appended and it is to be observed that apart from those living in the jungle there are in this District some half dozen cases of Orang utan women living in the kampong with Chinese or Malays as wives or as concubines, viz: at Ayer Panas, Kĕsang, Bukit Sĕnggeh, Batang Mĕlaka, Nyalas and possibly elsewhere.

ABORIGINES IN THE JASIN DISTRICT.

No.	Mukim		Tribe	Remarks.
1.	Ayer Panas, Ulu Gapam		Mĕntĕra & Jakun	5 or 6 houses, Hun Guan's estate.
2.	,,	Bĕmban (Ulu Samajok)	Mĕntĕra	2 or 3 houses.
3.	,,	Bĕmban	Mĕntĕra	3 houses.
4.	,,	Ayer Chĕrmin	Mĕntĕra	2 houses.

No.	Mukim	Tribe	Remarks.
* 5.	Ayer Panas, Bukit Kajang	Jakun	These have shifted, I believe, to Lanchang.
6.	Bukit Sĕnggeh, Bukit Bangkong	Mĕntĕra,	3 houses. Kĕnaboi, Bĕsisi
7.	Chabau near the middle of the kampong west of the road	Mĕntĕra	4 or 5 houses.
8.	Jasin, Tong Hin's estate	Mĕntĕra	2 or 3 houses.
9.	„ Payah Gomok	Mĕntĕra & Jakun	3 or 4 houses.
10.	Nyalas Forest Reserve, Bukit Gapis	Mĕntĕra	2 houses
11.	Nyalas, a few hundred yards lower down	Mĕntĕra	1 house
*12.	Rim, Gaung Dalam	Mĕntĕra	Now deserted.
*13.	Sĕlandar, east of road to Batang Mĕlaka, 24th mile	Mĕntĕra	1 house
14.	Sĕbatu, Batu Gajah	Bĕsisi	27 persons.

The average number of inmates of a house is probably between 4 and 5, i.e. 2 adults and 2 or 3 children.

---

* Not visited

Place-Names in the Hikayat Pasai.

By R. O. Winstedt.

For Journal No. 66 Mr. Mead romanized the *Hikayat Raja-Raja Pasai.* An otherwise excellent version, it is defaced by misspellings of place-names on pp. 50 and 54-55.

The second list on p. 54 should run:—

1. *Nĕgĕri Tambĕlan.* 2. *Nĕgĕri Siantan.* 5. *Nĕgĕri Subi.* 10. *Nĕgĕri Pĕmanggil.* 10b. *Nĕgĕri Karimata.* 11. *Nĕgĕri Bĕlitong.* 15. *Nĕgĕri Bentan.* 16. *Nĕgĕri Bulang.* 18. *Nĕgĕri Mampawa.* 19. *Nĕgĕri Sukadana.* 20. *Nĕgĕri Kota Waringin.* 23. *Nĕgĕri Kutai.*

I cannot identify *Bĕrumak* or as it should perhaps read *Bĕromok.*

In the second list on p. 55, the foll. emendations should be made:—

3. *Nĕgĕri Sumbawa.* 4. *Nĕgĕri Silĕparang.* 5. *Nĕgĕri Larantoka.* 8. *Nĕgĕri Bĕlambangan.*

The original MS. contains two errors; viz.

(*a*) 10. *Nĕgĕri Pĕmanggilan Karimata.*

(*b*) 6. *Nĕgĕri Karantoka.*

Most of the Sumatran place-names on p. 54 do not appear on modern maps. Probably they were very small places and have disappeared. The site of Samudĕra is discussed in Journal 14.

Malay Nursery Rhymes.

Collected by R. O. Winstedt.

To the collection of nursery rhymes given by Mr. Wilkinson on page 73 of his "Life and Customs, Part III, Malay Amusements" in the series of "Papers on Malay Subjects" published with the authority of the Government of the F. M. S., may be added the following collected by me from Selangor and Perak Malays.

Burong kakatua
  Bĕrsarang rumah batu.
Badan sudah tua,
  Gigi jarang sama satu.

Kura-kura, labi-labi,
  Kĕtupat makan ayam.
Orang tua 'nak bĕrlaki,
  Bĕrtongkat jalan malam.

Tĕtak rotan dini,
  Tanam limau purut.
Abang 'nak bĕrbini,
  Utang bĕrsĕngkarut.

Tĕtak rotan dini,
  Bawa Sungai Ulu.
Che abang 'nak bĕrbini,
  Bayar utang dahulu.

Tĕtak kayu chabang,
  Sandar pintu kolam.
Chantek tunang abang,
  Tetek macham sumpit garam.

Ikan jolong-jolong
  Masak sama chuka.
Nyonya jangan sombong,
  Baba tidak suka.

Ikan parang-parang
  Gulai sama chuka.
Nyonya gigi jarang
  Baba tidak suka.

Biar kurang masak,
Asal lĕbeh lada.
Biar kurang kachak,
Asal lĕbeh gaya.

Biar kurang garam,
Asal lĕbeh lada.
Biar kurang garang,
Asal lĕbeh gaya.

Chĕmpedak ka-ulu,
Durian masak mĕrĕkah.
Bĕrkĕndak dahulu,
Kĕmudian nikah.

Bintang timur tinggi,
Jatoh puchok nipah.
Abang tĕngah mĕngaji,
Adek minta sĕpah.

Sĕpah dalam batil;
Tepak dalam dulang.
"Minta bĕlanja satu tahil!"
"Nanti bapa pulang."

Bapa kenek-kenek
Masok lubang batu.
Pĕsan dato' ninek
Bĕli kain baju.

Kain baju basah,
Sĕlip balek pintu.
Abang baharu nikah,
Kĕluar chari kutu.

Rotan rotan jĕrĕmang,
Rakit dari ulu.
Kalau hĕndak minum,
Bayar utang dahulu.

Anak lotong mawa
Makan puchok bakau.
Sudah untong dĕnai
Mati tĕluk rantau.

Lok! Lang basok
Kĕtapang kayu api.
Minta minyak sa-cholek
'Nak mĕrĕndang tupai tadi.

Balai goyang-goyang,
Balai tĕngah ayer.
Rupa bagai wayang,
Gulai mĕntah chayer.

Burong kichak-kichau
Makan dalam dulang
Hati sangat kachau;
Ĕmbok lambat pulang.

Sang yo sang!
Nak hilir, ayer pasang.
Che Busu 'nak mĕnumpang,
Di-tahan oleh abang.

Anak udang gantong,
Chuchu udang galah.
Anak orang Tanjong,
Burok muntah darah.

Inche Kulup Langkat,
Anjing sorong balai.
Layar tĕrjuak,
Tiang tĕrbalek.

Ayam puteh ponggok
Makan padi jĕmur.
Che Puteh dudok mĕnumbok
Bagai bintang timur.

Buah jambu masak,
Masak pun ka-dalam.
Apa jamu kakak?
Nasi santan durian.

Buah kachang kachau
Tanam susur jirat.
Adek lela bongsu
Pandai lipat surat.

Usong usong kuda
Diam bawah batang.
Bila sudah tiba,
Bĕdil bĕlum pasang.

Anak rusa dandi
Baharu kĕmbang ekur.
Apa dosa kami,
Datang tidak tĕgur?

Undang-undang papan,
Surat dalam buloh.
Tunang dĕlapan,
Gundek tujoh-puloh.

The following are cradle-songs:—

Mang siku rimang!
Makan buah bĕrangan babi.
Ashikkan bĕrtimang,
Kĕrja satu pun ta' jadi.

Shipang mandak-ku shipang,
Shipang kaki sa-mola.
Sha-mola kuang-kuit
Sha-mola kuai-kapai.

Susu lĕmak manis,
Santan kĕlapa muda.
Che Busu jangan mĕnangis,
Di-upah tandok kuda.

Kuda kuda kang:
Puchok mali-mali.
Hari sudah pĕtang,
Di-pujok 'che busu mari.

Pok amai-amai,
Bĕlalang kupu-kupu.
Bĕrtĕpok pandai-pandai,
Malam sĕkarang upah susu.

U-auk ayam banting;
U-auk ayam dĕpar.
Tong tong paku,
Paku tanah liat aui.

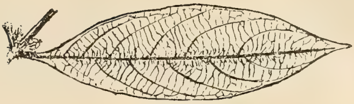
Liat tali timba,
Awang panching bulan aui
Bulan ta' ku-bĕri.
Maulud ĕnjak aui

Ĕnjak buloh bĕtong
Awang takok buloh aui.

Many of the lines are in baby-language; and some probably nonsense.

Lasianthus barbellatus, a new species from Pulau Tiuman, Pahang.

BY H. N. RIDLEY.



Leaf and group of flowers of *Lasianthus barbellatus*, reduced to 1/5.

Lasianthus barbellatus. Fruticulus 3-pedalis. *Rami* glabri. *Folia* subcoriacea, breviter acuminata, basi cuneata, supra glabra nitentia, infra in nervis majoribus pilosa, 3.5—4.5 poll. longa, 1.5 poll. lata: nervi utrinque septem, infra elevati: nervuli transversi indistincti: stipulae lanceolatae, acuminatae, pilosae. *Cymi* sessiles, .25 poll. longi. *Calyx* longe-pilosus: lobi lanceolati, acuminati. *Corolla* alba, tubo glabro, lobis tubo paullulo brevioribus oblongis.

PAHANG. In sylvis ad oras portus "Joara Bay" in insula Pulau Tiuman, legit I. H. Burkill cum floribus mense Junio, sub numero 976.

A shrub, 3 feet tall. Branches horizontal, glabrous. Leaves sub-coriaceous, shortly acuminate, base cuneate, above glabrous and shining, beneath with scattered stiff hairs on the midrib and nerves, which are 7 pairs and are elevate beneath, nervules faint transverse, 3.5—4.5 inches long by 1.5 inches wide: petiole .2 inches long, hairy. Cymes sessile, .25 inches long. Calyx long-hairy with lanceolate acuminate lobes. Corolla white, its tube glabrous, horizontal, its lobes oblong, and nearly as long as the tube.

Alabastra Borneensia.

By E. D. Merrill.

Bureau of Science, Manila, P.I.

Two previous papers on the Bornean flora have recently been published by me*, and the present contribution is in the nature of a continuation of these. Like the preceding papers, it consists chiefly of the description of apparently undescribed species in various genera, and the recording to Borneo for the first time of a number of previously described species of other authors. In the present communication forty-eight new species and one new genus are proposed in the families *Ulmaceae, Anacardiaceae, Elaeocarpaceae, Myrtaceae, Loganiaceae, Apocynaceae, Rubiaceae,* and *Compositae.* The larger number of additions to the Bornean flora, so far as the present paper is concerned, are found in the *Myrtaceae,* especially in the genus *Eugenia,* and in the *Elaeocarpaceae.*

ULMACEAE.

Gironniera, Gaudichaud.

Gironniera paucinervia, sp. nov.

Arbor glabra partibus exceptis junioribus et stipulis et fructibus minute adpresse strigillosis; *foliis* oblongo-ovatis, in siccitate pallidis, usque ad 10 cm. longis, glabris vel subtus minutissime scaberulis, basi acutis, aequilateralibus vel subaequilateralibus, apice tenuiter subcaudato-acuminatis, margine integris vel sursum obscure crenulatis, nervis utrinque 5 vel 6 adscendentibus curvatis anastomosantibus; *infructescentiis* axillaribus, solitariis, 1 ad 2 cm. longis; *fructibus* paucis, plerumque 1 vel 2, ovoideis, compressis, circiter 8 mm. longis, acuminatis.

A tree, the younger parts, stipules, and fruits minutely appressed strigillose, otherwise glabrous. Branches terete, slender, glabrous, grayish, the very young branchlets very sparingly appressed-strigillose. Leaves oblong-ovate, coriaceous, 5 to 10 cm. long, 2 to 3.5 cm. wide, rather pale when

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*Merrill, E. D. Notes on the Flora of Borneo. *Philip. Journal Science* **11** (1916) *Bot.* 49-100; Contributions to our Knowledge of the Flora of Borneo. *Jour. Str. Branch. Roy. As. Soc.* **76** (1917) 75-117.

dry, base acute, equilateral or nearly so, apex slenderly subcaudate-acuminate, the margins entire or slightly crenate toward the apex, the upper surface smooth, shining, the lower obscurely scaberulous; lateral nerves 5 or 6 on each side of the midrib, prominent, curved, ascending, anastomosing, the reticulations close, distinct; petioles about 5 mm. long, sparingly appressed-strigillose; stipules lanceolate, acuminate, 8 to 12 mm. long, appressed strigillose on the exposed portions. Infructescences axillary, solitary, simple, 1 to 2 cm. long, sparingly appressed-strigillose, the fruits usually one or two. Sepals ovate, somewhat acuminate, about 2 mm. long, somewhat strigillose. Fruits ovoid, somewhat compressed, very minutely strigillose, olivaceous, acuminate, about 8 mm. long, tipped by the persistent 2 to 3 mm. long style.

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Mrs. Clemens 10998,* December 3, 1915.

The alliance of this species is manifestly with *Gironniera subaequalis,* Planch., from which it is distinguished by its smaller, fewer nerved, equilateral or nearly equilateral leaves, its depauperate infructescences, and its obscure, scattered, strigillose hairs, the plant, in age, being nearly glabrous.

ANACARDIACEAE.

Melanorrhoea, Wallich.

Melanorrhoea oba, sp. nov. § *Pleiocyclae.*

Arbor circiter 20 m. alta, floribus exceptis glabra; *foliis* oblongo-ellipticis ad oblongo-obovatis, coriaceis, in siccitate pallidis, nitidis, usque ad 18 cm. longis, apice breviter obtuseque acuminatis, basi cuneatis vel leviter decurrento-acuminatis, nervis utrinque 12 ad 14 distinctis; *paniculis* quam foliis longioribus, laxissime paucifloris; *floribus* longissime pedicellatis, 5-meris, sepalis calyptratim deciduis, lanceolatis, acuminatis, striatis, 6 mm. longis; *petalis* linearibus, leviter pubescentibus, 8.5 mm. longis; *staminibus* 10 in axi floris incrassato insertis, leviter pubescentibus, 2 mm. longis; filamentis leviter pubescentibus, 5 mm. longis.

A tree about 20 m. high, entirely glabrous except the flowers. Branches terete, reddish-brown. Leaves oblong-elliptic to oblong-obovate, coriaceous, 9 to 18 cm. long, 4 to 7 cm. wide, usually subequally narrowed at both ends, the apex shortly and bluntly acuminate, base cuneate or somewhat decurrent-acuminate, when dry pale, shining, and of the same color on both surfaces; lateral nerves 12 to 14 on each side of the midrib, rather prominent on the lower surface, curved, anastomosing, the reticulations distinct; petioles 1 cm.

long. Panicles terminal or in the uppermost axils, very lax, up to 25 cm. in length, the branches few, spreading, the lower ones up to 12 cm. in length, each primary branch with from 3 to 5 racemosely arranged long-pedicelled flowers. Flowers 5-merous, their pedicels slender, glabrous, 1.5 to 2.5 cm. long. Calyx calyptrate, deciduous, 6 mm. long, lanceolate in outline, longitudinally striate, acuminate, glabrous. Petals 5, linear, 8 to 9 mm. long in anthesis, 0.8 mm. wide, sparingly pubescent on both surfaces. Stamens 10, inserted on the thickened, oblong-ovoid, sparingly pubescent axis of the flower; filaments pubescent, 5 mm. long. Gynophore 2 mm. long, pubescent; ovary ovoid, brown when dry, glabrous, 1 mm. long; style 1.5 mm. long.

BRITISH NORTH BORNEO, Sandakan, *Villamil 316,* February 22, 1917, on forested slopes, altitude 30 to 120 meters, the flowers white; locally known as *oba.*

Among the Bornean species this is apparently most closely allied to *Melanorrhoea macrocarpa,* Engl., but has larger, less acuminate, shorter petioled leaves and glabrous panicles. It seems, from the description, to be more closely allied to *M. curtisii,* Oliver, of the Malay Peninsula, than to any of the previously described Bornean species.

ELAEOCARPACEAE.

Elaeocarpus, Linnaeus.

This genus beautifully illustrates how little is definitely known regarding the Bornean flora. There are in our comparatively small collections of Bornean plants at least twenty-five distinct species of this characteristic genus, not all of which are in condition for determination, some specimens being with very young buds, others with fruits only. Species previously credited to Borneo are few in number and include the endemic species *Elaeocarpus beccarii,* Aug. DC., *E. gambir,* Becc., *E. octantherus,* Aug. DC., *E. longipetiolatus,* Merr., and *E. sericeus,* Stapf; as well as species previously described from extra-Bornean material, such as *E. longifolius,* Blume, *E. obtusus,* Blume (probably *E. littoralis,* T. & B.), *E. stipulis,* Blume, perhaps a misidentification of *E. gambir,* Becc., *E. acronodia,* Mast. (not *Aronodia punctata,* Blume) = *E. mastersii,* King, and *E. griffithii,* Mast. In view of the fact that further collections will unquestionably yield many additions to the list of Bornean species of *Elaeocarpus,* I have made no attempt to prepare a key to the species already known from the Island, but record below a number of species new to Borneo and describe nine as new. Five or six additional forms, none of which can be referred definitely to any described species, are represented in our collections, but before reporting them additional material will be necessary in each case.

Elaeocarpus chrysophyllus, sp. nov. § *Acronodia.*

Arbor, ramulis junioribus et subtus foliis et petiolis densissime adpresse chryseo- ad argenteo-pubescentibus, indumento nitido; *foliis* longe petiolatis, coriaceis, lanceolatis ad oblongo-lanceolatis, usque ad 10 cm. longis, tenuiter subcaudato-acuminatis, basi acutis, margine obscure adpresse apiculatis, nervis utrinque 8 vel 9, distinctis; *racemis* axillaribus, cinereo-pubescentibus, junioribus usque ad 5 cm. longis; *floribus* ♂ 4- vel raro 5-meris; *bracteolis* lanceolatis, circiter 5 mm. longis, basi biappendiculatis; *petalis* circiter 4 mm. longis (immaturis), apice breviter laciniatis, laciniis 10 ad 12, extus pubescentibus, intus glabris; *antheris* 8 vel 10.

A tree, the young branchlets petioles and lower surface of the leaves very densely and uniformly appressed-pubescent with shining golden to somewhat silvery hairs. Branches terete, glabrous, reddish-brown, about 4 mm. in diameter. Leaves coriaceous, lanceolate to oblong-lanceolate, 8 to 10 cm. long, 2.5 to 3.5 cm. wide, the apex slenderly caudate-acuminate, the acumen apiculate, base acute, margins obscurely and minutely appressed apiculate-toothed, the upper surface brownish-olivaceous, shining, glabrous except for the silvery-pubescent midrib, the lower surface uniformly and densely appressed-pubescent, the indumentum on the younger leaves golden, on the older ones silvery; lateral nerves 8 or 9 on each side of the midrib, distinct, curved, anastomosing; petioles densely silvery or golden-pubescent, 3 to 4.5 cm. long. Racemes axillary, in mature bud up to 5 cm. in length, densely cinereous-pubescent, the bracteoles pubescent, lanceolate, about 5 mm. long, each with a pair of linear, 1.5 mm. long, basal appendages or lobes, the pedicels 3 to 4 mm. long. Buds narrowly ovoid, obtuse, 4 mm. long. Sepals 4, rarely 5, externally densely cinereous-pubescent. Petals oblong-obovate, about 4 mm. long (in bud), somewhat pubescent on the back, glabrous within, the tip divided into 10 to 12, 1 mm. long, narrow lobes. Stamens 8 or 10; filaments 1 mm. long; anthers oblong, obtuse, 1.8 mm. long, one cell slightly longer than the other, not bearded. Disk-glands densely hirsute. Rudimentary ovary none.

SARAWAK, without definite locality, *Native collector 1965* (*Bur. Sci.*).

This characteristic species of the section *Acronodia* is readily distinguishable by its lanceolate, slenderly acuminate leaves which, except for the midrib, are glabrous on the upper surface and densely golden to silvery appressed-pubescent on the lower surface.

Elaeocarpus cupreus, sp. nov. § *Acronodia.*

Arbor, plus minusve pubescens; *foliis* coriaceis, elliptico-ovatis, usque ad 11 cm. longis, prominente acuminatis, basi acutis, integris vel obscurissime denticulato-crenulatis, in siccitate supra glabris subolivaceis, subtus uniformiter cupreis, ad costa nervisque puberulis, utrinque nitidis; nervis utrinque 8 ad 10, subtus prominentibus, reticulis tenuibus, subparallelis; *racemis* axillaribus, petiolo subaequalibus, pubescentibus; *floribus* ♀ 5-meris, breviter pedicellatis, 4 mm. longis; *sepalis petalisque* oblongo-lanceolatis, utrinque pubescentibus, integris, obscure acuminatis; *ovario* dense pubescente, 3-loculare.

A tree, the branchlets, petioles, midrib and lateral nerves on the lower surface of the leaves and the inflorescences minutely and densely brownish-pubescent or puberulent. Branches brown, somewhat pubescent, terete. Leaves coriaceous, elliptic-ovate, 7 to 11 cm. long, 3.5 to 5.5 cm. wide, subequally narrowed to the broadly acute base and to the rather prominently acuminate apex, the acumen usually somewhat falcate, blunt, the margins entire or minutely and obscurely denticulate-crenulate, the upper surface glabrous except the impressed midrib, pale-olivaceous, shining, the lower surface cupreous, shining, puberulent on the midrib and lateral nerves; lateral nerves prominent on the lower surface, curved, anastomosing, 8 to 10 on each side of the midrib, the reticulations very slender, subparallel; petioles brownish-puberulent, 2 to 3.5 cm. long. Racemes axillary, solitary, pubescent, about as long as the petioles, the flowers scattered below, rather densely arranged above, nodding, 5-merous, their pedicels stout, pubescent, 2 mm. long or less, each subtended by a thick, subovate, 1 mm. long bracteole. Pistillate flowers: Sepals 5, oblong-lanceolate, acuminate, 4 mm. long, 1.5 mm. wide, uniformly pubescent with short, pale-brownish, somewhat shining hairs on both surfaces. Petals similar to the sepals in all respects, of the same size, entire. Staminodes usually 8, spatulate, 1 to 1.5 mm. long, the upper thickened part minutely and obscurely pubescent. Ovary ovoid, densely pubescent, 3-celled; style about 1 mm. long. Staminate flowers not seen.

SARAWAK, without definite locality, *Native collector 1702 (Bur. Sci.)*.

This rather remarkable species is well characterized by its leaves, when dry, being pale-olivaceous on the upper surface and uniformly cupreous on the lower surface, as well as by its oblong-lanceolate, entire petals which in all respects are similar to the sepals. It is not closely allied to any previously described species known to me.

Elaeocarpus elliptifolius, sp. nov. § *Acronodia.*

Arbor circiter 5 m. alta, inflorescentiis et petiolis et ramulis junioribus subtus foliis ad costa nervisque dense rufo-

tomentosis; *foliis* coriaceis, ellipticis, usque ad 15 cm. longis, integris vel obscurissime denticulatis, breviter acuminatis, basi late acutis ad rotundatis, supra, costa excepta, glabris, olivaceis, nitidis, subtus brunneis, nervis utrinque circiter 8, prominentibus; *racemis* ex axillis defoliatis, circiter 2 cm. longis; *floribus* 4-meris; *sepalis* lanceolatis, 4 mm. longis, acuminatis, extus ferrugineo-tomentosis, intus parcissime pubescentibus; *petalis* oblongis, apice obscurissime 4-dentatis, extus dense adpresse ferrugineo-pubescentibus, intus leviter pubescentibus; *staminibus* 10; *fructibus* ellipsoideis, olivaceis 1 cm. longis, laevibus, junioribus leviter pubescentibus, vetustioribus glabrescentibus.

A tree about 5 m. high, the younger parts and the midrib and nerves on the lower surface of the leaves densely rufous-tomentose. Branches terete, dark-brownish, nearly glabrous. Leaves elliptic, coriaceous, 10 to 15 cm. long, 5 to 7.5 cm. wide, shortly and usually obtusely acuminate, base broadly acute to rounded, margins entire or above minutely and obscurely denticulate, the upper surface glabrous, except the midrib, olivaceous, shining, the lower surface brownish when dry; lateral nerves 8 on each side of the midrib, prominent, somewhat curved, anastomosing, the reticulations distinct, subparallel, rather lax; petioles 3 to 5 cm. long, thickened at the apex, densely rufous-tomentose, in age glabrous or nearly so. Racemes from the axils of fallen leaves, solitary, few flowered, about 2 cm. long, rufous-tomentose. Flowers 4-merous, their pedicels 2 to 3 mm. long. Sepals lanceolate, acuminate, 4 mm. long, 1.5 mm. wide, outside ferruginous or rufous-tomentose, inside with scattered hairs. Petals nearly as long as the sepals, oblong, outside densely appressed-tomentose, inside with scattered hairs, the apex minutely and obscurely 4-toothed. Stamens 10; filaments 1 mm. long or less; anthers oblong, subacute at both ends, scabrid, 1.5 to 1.8 mm. long, one cell slightly exceeding the other, not bearded. Rudimentary ovary densely tomentose. Disk-glands densely tomentose. Fruit ellipsoid, olivaceous when dry, 1 cm. long, more or less pubescent, becoming glabrous or nearly so, smooth, shining, 1-celled, 1-seeded, the endocarp rather hard, rugose, externally somewhat fibrillose.

British North Borneo, Mount Kinabalu, Gurulau Spur, *Mrs. Clemens 10783,* in forests near the summit.

This species is manifestly very closely allied to *Elaeocarpus jackianus,* Wall., which it closely resembles in most particulars, but from which it is distinguished by its much shorter racemes, densely pubescent ovaries, and more or less pubescent, somewhat smaller fruits.

Elaeocarpus clementis, sp. nov. § *Dicera.*

Arbor parva, foliis subtus ad costam et petiolis et ramulis et inflorescentiis plus minusve ferrugineo-pubescens; *foliis* subcoriaceis, oblongo-ovatis ad oblongo-ellipticis, longe petiolatis, usque ad 20 cm. longis, in siccitate brunneis vel subolivaceis, apice acuminatis, basi acutis, subtus minutissime et obscure glandulosis, nervis utrinque circiter 13 valde prominentibus curvatis anastomosantibus, reticulis tenuibus subparallelis; *racemis* axillaribus, petiolis aequalibus vel longioribus; *floribus* 5-meris, circiter 6 mm. longis, sepalis petalisque utrinque dense pubescentibus; *petalis* oblongis, utrinque angustatis, integris vel minutissime et obscure 2- vel 3-denticulatis; *staminibus* circiter 40; *ovario* pubescente, 3-loculare.

A small tree, the younger branchlets and inflorescences densely ferruginous-pubescent, the petioles and midribs on the lower surface of the leaves also pubescent. Branches terete, reddish-brown, glabrous. Leaves subcoriaceous, brownish to subolivaceous when dry, shining, of about the same color on both surfaces or somewhat paler beneath, oblong-ovate to oblong-elliptic, 11 to 20 cm. long, 4 to 9 cm. wide, the base rather broadly acute, not rounded, apex prominently acuminate, the acumen often slender, the margins crenate-apiculate, the lower surface minutely and obscurely glandular, glabrous except the midrib; lateral nerves about 13 on each side of the midrib, very prominent, curved, ascending, anastomosing, the reticulations slender, subparallel; petioles 4 to 10 cm. long. Racemes axillary and in the axils of fallen leaves, solitary, equaling or somewhat longer than the petioles, rather densely pubescent, many flowered. Flowers yellowish, 5-merous, their pedicels 7 to 9 mm. long, the buds ovoid. Sepals oblong, acuminate, about 5 mm. long, 1.5 to 2.3 mm. wide, uniformly and densely pubescent on both surfaces. Petals oblong, narrowed at both ends, about 6 mm. long, 2.5 mm. wide, both surfaces densely pubescent, the hairs on the inner surface reflexed, the apex acute, entire or very obscurely 2- or 3-toothed. Stamens about 40; filaments about 1 mm. long; anthers oblong-obovoid, rounded, scabrid, 1 to 1.2 mm. long, the tip not bearded. Ovary densely pubescent, ovoid, 3-celled; style glabrous, about 1 mm. long. Fruit ellipsoid, 1 to 1.5 cm. long, glabrous, smooth, grayish or brownish when dry, the endocarp hard, rather smooth.

SARAWAK, Baram District, Lio-matu, *Native collector 2766* (*Bur. Sci.*) (type); without locality, *Native collector 733* (*Bur. Sci.*): BRITISH NORTH BORNEO, Mount Kalawat, *Mrs. Clemens 11165,* along trails, margin of forests.

The alliance of this species is manisfestly with the Sumatran *Elaeocarpus integripetalus,* Miq., which was rather

imperfectly described by Miquel. *Elaeocarpus integripetalus,* Miq. has somewhat fewer nerved leaves which are rounded at the base, racemes much shorter than the petioles, and 4-merous flowers.

Elaeocarpus nigropunctatus, sp. nov. § *Dicera.*

Arbor, ramulis et foliis utrinque ad costam et petiolis et inflorescentiis dense pubescens; *foliis* oblongo-ovatis, crasse coriaceis, usque ad 6 cm. longis, in siccitate brunneis, subtus pallidioribus et perspicue nigro-punctatis, acuminatis, basi acutis ad subrotundatis, nervis utrinque 4 curvato-adscendentibus valde prominentibus; *racemis* axillaribus, 2 ad 3 cm. longis, paucifloris; *floribus* 5-meris, circiter 4 mm. longis; *petalis* obovatis, glabris, in $\frac{1}{3}$ superiore parte fimbriatis, laciniis 16 ad 20; *staminibus* circiter 15; *ovario* parce pubescente, 4-loculare.

A tree, the branchlets, petioles, inflorescence, and the costa on both surfaces of the leaves densely subappressed pale-fulvous pubescent. Branches terete, glabrous, grayish brown. Leaves oblong-ovate, thickly coriaceous, brown when dry, 4 to 6 cm. long, 1.5 to 2 cm. wide, the upper surface smooth, shining, the lower paler, dull, prominently glandular with scattered, black or dark-colored glands distinctly visible to the naked eye, base acute to somewhat rounded, apex acuminate, margin slightly crenate; lateral nerves 4 on each side of the midrib, very prominent on the lower surface, curved-ascending, anastomosing, the reticulations lax, distinct; petioles 1 to 1.5 cm. long; stipules none or minute and caducous. Racemes axillary, solitary, few-flowered, 2 to 3 cm. long, the flowers 5-merous, their pedicels densely pubescent, 5 to 6 mm. long, usually curved, each subtended by an oblong, densely pubescent, 2 mm. long, obtuse bracteole that is minutely mucronate-toothed along the margins, with often one or two reduced bracteoles above. Sepals oblong-lanceolate, acute, externally densely pubescent, 3 to 3.5 mm. long, slightly pubescent inside. Petals obovate, 4 mm. long, entirely glabrous except for the very few hairs on the median portion near the base inside, narrowed below to the cuneate base, the upper one-third cut into from 16 to 20 slender fimbriae. Stamens about 15; filaments 1 mm. long; anthers glabrous or nearly so, oblong, 1.2 mm. long, the cells equal, obtuse. Torus about 2 mm. in diameter, of five, conspicuous, bilobed, densely pubescent glands. Ovary ovoid, sparingly pubescent, 4-celled; style 2 mm. long, glabrous.

SARAWAK, Matang Road, *Native collector 734* (*Bur. Sci.*), August 11, 1911.

A most characteristic species readily distinguishable by its small, thickly coriaceous, few-nerved leaves which are prominently glandular beneath, the minute black glands being distinctly visible to the naked eye. Its alliance is apparently with *Elaeocarpus wrayi,* King, of the Malay Peninsula.

Elaeocarpus hosei, sp. nov. § *Dicera.*

Arbor, ramulis junioribus et inflorescentiis exceptis glabra; *foliis* oblongo-ellipticis, usque ad 17 cm. longis, nitidis, utrinque concoloribus, in siccitate brunneis, basi acutis, apice perspicue acuminatis, margine distincte crenatis vel denticulato-crenatis, nervis utrinque 7 vel 8 prominentibus; *racemis* ex axillis defoliatis, 15 ad 17 cm. longis, adpresse pubescentibus; *floribus* 5-meris, circiter 12 mm. diametro; *sepalis* lanceolatis, acuminatis, extus parcissime pubescentibus; *petalis* obovato-cuneatis, usque ad $\frac{2}{3}$ in laciniis numerosis (circiter 30) filiformibus divisis, laciniis in phalangibus 5 dichotomis dispositis; *antheris* obtusis, valvulis aequalibus; *ovario* parcissime pubescente vel subglabro, 3-loculare.

A tree, glabrous except the youngest branchlets and the inflorescences. Branches terete, smooth, grayish, not or very obscurely lenticellate. Leaves subcoriaceous, oblong-elliptic, 13 to 17 cm. long, 5.5 to 7.5 cm. wide, of about the same color on both surfaces, brown and shining when dry, the midrib on very young leaves slightly pubescent, otherwise glabrous, the base acute, apex rather prominently acuminate, margins distinctly crenate, often denticulate-glandular; lateral nerves 7 or 8 on each side of the midrib, prominent, anastomosing, the reticulations lax; petioles 2.5 to 5 cm. long. Racemes numerous, spreading, from the axils of the fallen leaves, 15 to 17 cm. long, appressed-pubescent with somewhat brownish hairs. Flowers numerous, 5-merous, 10 to 12 mm. in diameter, their pedicels about 1 cm. long. Sepals brown when dry, lanceolate, acuminate, about 6 mm. long, 2 mm. wide, externally obscurely pubescent, margins puberulent, inside keeled and slightly pubescent at the base. Petals obovate-cuneate, about 6 mm. long and 5 mm. wide, narrowed to the cuneate base, the upper two-thirds cut into about 30, very slender laciniae, these in turn arranged in five dichotomous phalanges, margins of the lower part obscurely pubescent and the base outside with a few hairs, otherwise glabrous. Stamens about 35; filaments scabrid, 1.5 mm. long, curved, anthers oblong, scabrid, 2 mm. long, the cells obtuse, equal, not bearded at the tips. Disk glands densely pubescent, contiguous, obscurely bilobed, forming a prominent torus 3 mm. in diameter. Ovary ovoid, very sparingly pubescent below, glabrous above, 3-celled; style glabrous, 2 mm. long.

SARAWAK, Baram District, Baram, *Hose 25* (type), *273,* the former collected in January, 1895.

The alliance of this species is manifestly with *Elaeocarpus glaber,* Blume, of Java, of which a complete description has apparently never been published. My conception of the species is based largely on the figure given by Koorders, (*Atlas Baumart. Java, fig. 427*), which was in part drawn from Blume's type material. The Bornean form differs in its larger, more numerously nerved, more prominently acuminate leaves, longer petioles, apparently slightly larger flowers, differently shaped petals, and but very slightly pubescent ovary.

Elaeocarpus dolichobotrys, sp. nov. § *Dicera.*

Arbor, novellis inflorescentiisque exceptis glabra; *foliis* oblongis ad oblongo-ovatis, subcoriaceis, olivaceis, nitidis, usque ad 27 cm. longis et 13 cm. latis, apice obtusis, basi rotundatis, margine perspicue crenatis, crenulis in sinubus apiculato-glandulosis, nervis utrinque circiter 16; *racemis* ex axillis defoliatis, solitariis, leviter pubescentibus, usque ad 40 cm. longis, multifloris; *floribus* circiter 1.5 cm. diametro, 5-meris; *sepalis* margine excepto glabris, 7 mm. longis; *petalis* obovato-cuneiformibus, circiter 8 mm. longis, infra obscure pubescentibus, multifimbriatis; *staminibus* circiter 40, antheris obtusis, valvis aequilongis; *ovario* pubescente, 3-loculare.

A tree, the growing tip of the branchlets and the inflorescence more or less pubescent, otherwise glabrous. Branches terete, grayish-brown, the branchlets smooth, reddish-brown, glabrous except the very tip. Leaves alternate, large, oblong to oblong-ovate, subcoriaceous, olivaceous and shining when dry, of the same color on both surfaces, up to 27 cm. long and 13 cm. wide, base broadly rounded, narrowed in the uppermost part to the obtuse apex, the margins prominently crenate, the sinuses apiculate-glandular; lateral nerves about 16 on each side of the midrib, prominent, anastomosing, the reticulations lax; petioles 5 to 8 cm. long. Racemes solitary, from the axils of fallen leaves, 30 to 40 cm. long, sparingly pubescent. Flowers numerous, cream-colored, 5-merous, about 1.5 cm. in diameter, perfect, their pedicels slightly pubescent 5 to 8 mm. long. Buds ovoid, slightly pubescent. Sepals in anthesis oblong-lanceolate, acuminate, 7 mm. long, 2.5 to 3 mm. wide, glabrous, prominently keeled within, their margins puberulent. Petals obovate-cuneate, about 6 mm. long, 6 to 7 mm. wide above, minutely and obscurely pubescent in the lower 2 mm. inside and on the margins in the lower 4 mm. otherwise glabrous, the upper two-thirds cut into about 40 very slender fimbriae, these arranged in about 9 phalanges. Stamens about 40: filaments curved, about 2 mm. long; anthers oblong, scabrid, 2.5 mm. long, the valves equal, obtuse, with no terminal tuft of hairs. Disk-glands prominent, densely pubescent, more or less reniform, about 2.5 mm. wide. Ovary ovoid, pubescent, 3-celled; style 2 mm. long, glabrous.

BRITISH NORTH BORNEO, Mount Kinabalu, Kiau, *Clemens 10048*, November, 1915.

This species is well characterized by its large leaves and its greatly elongated racemes. It is undoubtedly allied to *Elaeocarpus robustus*, Roxb., from which it is distinguished by its larger, more numerously nerved leaves, much longer racemes, and larger flowers.

Elaeocarpus castaneus, sp. nov. § *Ganitrus*.

Arbor, ramulis junioribus et subtus foliis ad costam nervosque et petiolis et inflorescentiis uniformiter cinereo-pubescens; *foliis* in siccitate castaneis, nitidis, oblongis, subcoriaceis, usque ad 15 cm. longis, nitidis, perspicue obtuse acuminatis, basi subacutis ad subrotundatis, margine distanter obscure crenulatis vel subintegris, nervis utrinque 7 vel 8, prominentibus; *racemis* numerosis, ex ramulis defoliatis, usque ad 16 cm. longis, multifloris, 5-meris; sepalis lanceolatis, acuminatis, 5 mm. longis, utrinque pubescentibus; petalis obovato-cuneatis, leviter pubescentibus, in dimidio superiore laciniatis, laciniis circiter 25; *staminibus* 25 ad 30, antheris oblongis obtusis; *ovario* dense pubescente, 5-loculare.

A tree, the branchlets, midrib and nerves on the lower surface of the leaves, petioles and inflorescences uniformly subappressed, cinereous-pubescent. Branches terete, glabrous, reddish-brown, somewhat glaucous. Leaves oblong, castaneous when dry, shining, the lower surface slightly paler than the upper, 9 to 15 cm. long, 4 to 6 cm. wide, rather prominently acuminate, the acumen blunt, usually minutely apiculate, base subacute to somewhat rounded, margins entire or with very few, minute, widely scattered crenulations, the upper surface glabrous except the sparingly pubescent midrib, the lower surface pubescent on the midrib and lateral nerves; petioles 2 to 2.5 cm. long, pubescent; lateral nerves 7 or 8 on each side of the midrib, prominent, curved, anastomosing, the primary reticulations slender, subparallel. Racemes from the ultimate branches below the leaves, numerous, spreading, uniformly cinereous-pubescent, 14 to 16 cm. long, many-flowered. Flowers 5-merous, their pedicels pubescent, 6 to 7 mm. long. Sepals lanceolate, acuminate, 5 mm. long, 1.8 mm. wide, pubescent on both surfaces, slightly keeled inside, the margins densely cinereous-puberulent. Petals obovate-cuneate, about 6 mm. long, the upper one-half cut into about 25 slender laciniae, these arranged in about 6 phalanges, very sparingly pubescent on both surfaces toward the base and on the margins, base cuneate. Stamens 25 to 30; filaments about 1 mm. long; anthers oblong, obtuse, 1.2 to 1.5 mm. long, the longer cell tipped with 2 or 3 short hairs. Torus about 2.5 mm. in diameter, of five, prominent, densely pubescent, somewhat 2-lobed glands. Ovary ovoid, densely pubescent, 5-celled; style 3 mm. long, somewhat pubescent in the lower one-half.

SARAWAK, Baram District, Baram, *Hose 699* (type), *110*, April, 1895 and October, 1894.

From the 5-celled ovary this species probably belongs to the section *Ganitrus,* but it may be a species of the section *Dicera,* some of which have 5-celled ovaries. It somewhat resembles *Elaeocarpus stipularis,* Blume, but is distinguished by its fewer-nerved leaves which are glabrous except the midrib and nerves; there are no stipules on the specimens examined. From *Elaeocarpus ganitrus,* Roxb. it is distinguished by its fewer-nerved leaves, its anthers on distinct filaments, and other characters.

Elaeocarpus winkleri, sp. nov. § *Monocera.*

Arbor, inflorescentiis leviter pubescentibus exceptis glabra; *foliis* subcoriaceis, in siccitate pallidis, nitidis, oblongo-ovatis, usque ad 8 cm. longis, basi acutis vel subacutis, apice tenuiter acuminatis, margine obscurissime leviter glanduloso-denticulatis, nervis utrinque 7, subtus prominentibus, curvatis, anastomosantibus, reticulis densis, subfoveolatis; *racemis* axillaribus, solitariis, usque ad 6 cm. longis, leviter adpresse cinereo-pubescentibus, partibus vetustioribus glabris; *floribus* 5-meris, 6 ad 7 mm. longis; *sepalis* in siccitate nigris, lanceolatis, acuminatis, utrinque leviter pubescentibus; *petalis* oblongis vel obscure oblongo-obovatis, extus parcissime pubescentibus, intus ad carinam prominente densissime villosis, basi late rotundatis, cucullatis, margine plus minusve inflexis, apice usque ad tertiam partem fimbriatis, fimbriae 10 ad 13; *staminibus* circiter 25; *ovario* pubescente, 3-loculare.

A tree, entirely glabrous except the sparingly cinereous-pubescent inflorescence and the buds at the tips of the branchlets. Branches terete, brownish, the younger parts dark reddish-brown. Leaves numerous, oblong-ovate, subcoriaceous, pale and shining when dry, 5 to 8 cm. long, 2 to 3.5 cm. wide, apex slenderly and prominently acuminate, base acute, subacute, or sometimes slightly rounded, margins obscurely and distantly glandular-denticulate, the apiculate tips of the teeth black, appressed, the upper surface smooth, the lower subfoveolate by the close ultimate reticulations; lateral nerves 7 on each side of the midrib, prominent on the lower surface, curved, anastomosing; petioles 1.5 to 2.5 cm. long. Racemes axillary, solitary, 5 to 6 cm. long, rather few flowered, sparingly appressed cinereous-pubescent, the older parts glabrous or nearly so. Flowers 5-merous, 6 to 7 mm. long, their pedicels about 5 mm. long. Sepals black when dry, lanceolate, acuminate, 6 mm. long, 1.5 mm. wide, sparingly pubescent on both surfaces, the margins densely cinereous-puberulent. Petals 6 to 7 mm. long, oblong to somewhat oblong-obovate, base scarcely narrowed, broadly rounded, cucullate, margins somewhat inflexed, apical one-third cut into 10 to 13 slender fimbriae, the margins pubescent, the back sparingly pubescent in the median portion, inside densely villous on the very prominent keel. Stamens about 25; filaments 1.5 mm. long, glabrous, narrowed upward; anthers oblong, including the slender 1.2 mm. curved awn of the outer cell 3 mm. in length, scabrid. Disk-glands 5, densely pubescent, cleft, 0.8 mm. in diameter. Ovary ovoid, pubescent, 3-celled; style 5 mm. long, pubescent.

SOUTH-EAST BORNEO, *Winkler 3303*, August, 22, 1908, "Heidewald vor Djihi." A sterile specimen from Sarawak, *Sarawak Museum 94*, 1913, apparently represents the same species.

Elaeocarpus griffithii, (Wight) Mast. in Hook. f., Fl. Brit. Ind. **1** (1874) 408.

Monocera griffithii, Wight, Ill. **1** (1841-50) 84.

SARAWAK, without definite locality, *Native collector 1675 (Bur. Sci.)*.

The specimen has young buds, but they are sufficiently mature to present the characteristic petals and stamens of the above species, while in vegetative characters the specimen agrees perfectly with the excellent series of specimens available for comparison from the Malay Peninsula. The species has previously been credited to Borneo by Pierre.

Tenasserim and Indo-China to the Malay Peninsula, Sumatra, and Java.

Elaeocarpus littoralis, T. & B., Cat. Hort. Bogor. (1866) 390; Pierre, Fl. Forest. Cochinch., *t. 141;* Gagnepain in Lecomte Fl. Gén. Indo-Chine, **1** (1910) 569.

SARAWAK, Baram District, Redan, *Hose 292*, March 11, 1894.

This species has previously been reported from Borneo by King (in *Journ. As. Soc. Beng.* **60**^{2} (1891) 134), who, however, confused *Elaeocarpus littoralis*, T. & B., with *E. robustus*, Blume. Koorders, (*Exkursionsflora von Java* **2** (1912) 570), distinguishes *Elaeocarpus littoralis*, T. & B., from *E. obtusus*, Blume, stating that the former is not wild in Java, but is rarely cultivated in parks; the type of *Elaeocarpus obtusus*, Blume, was from Mount Salak, Java. Both *Elaeocarpus littoralis*, T. & B., and *E. obtusus*, Blume, judging from the descriptions of the latter species, are entirely distinct from the Philippine *E. monocera,* Cav. The Bornean specimen, cited above, agrees perfectly with the descriptions of *Elaeocarpus littoralis,* T. & B., and with Indo-China specimens collected by Thorel.

Burma and Indo-China, the Malay Peninsula, Sumatra, and Java (cultivated).

Elaeocarpus pedunculatus, Wall. Cat. (1831) no. 2678 p.p., *nomen nudum;* Mast. in Hook. f., Fl. Brit. Ind. **1** (1874) 408; King in Journ. As. Soc. Beng. **60**^{2} (1891) 132.

SARAWAK, Samatan, *Foxworthy 147,* May 20, 1908, Malay *m'padu,* Dyak *tumu puti;* Baram District, Miri River, *Hose 538,* January, 1895.

Foxworthy's specimen agrees so exactly with King's extended description that I have no hesitation in referring it to Wallich's species, although I have seen no named specimens representing it. The species is definitely reported from Penang, Malacca, Perak, and Singapore. The closely allied *Monoceras palembanicum,* Miq., of Sumatra is described as having leaves rather long acuminate.

Elaeocarpus mastersii, King in Journ. As. Soc. Beng. **60**^{2} (1891) 140.

SARAWAK, *Native collector 1499, 1942, 2330* (*Bur. Sci.*): BRITISH NORTH BORNEO, Sandakan, *Villamil 208,* April 1, 1916.

The specimens cited above agree perfectly with King's description and with a large series of specimens representing the species from the Malay Peninsula and Singapore. This form is doubtless the basis of the Bornean reference given by Masters in Hook. f. Fl. Brit. Ind. **1** (1874) 408 under *Elaeocarpus acronodia,* Mast.

Elaeocarpus paniculatus, Wall. Cat. (1831) No. 2663, *nomen nudum;* C. Muell, Adn. Fam. Elaeocarp. (1849) 12.

Monoceras leucobotryum Miq. Fl. Ind. Bat. Suppl. (1862) 409.

SARAWAK, Lundu, *Foxworthy 38,* May 10, 1908, known to the Dyaks as *umpuldú;* Baram, *Hose 291;* near Kuching, *Native collector 126, 2153* (*Bur. Sci.*).

The Bornean material agrees closely with our fine series of specimens representing Wallich's species from the Malay Peninsula. The petals are slightly and obscurely toothed at the apex, this being true of some of the specimens from the Malay Peninsula, although King described them as entire.

Malay Peninsula and Banka, not previously recorded from Borneo.

Elaeocarpus polystachyus, Wall. Cat. (1831) No. 2671, *nomen nudum,* C. Muell. Adn. Fam. Elaeocarp. (1849) 12.

SARAWAK, without definite locality, *Sarawak Museum 41,* 1913.

The specimen presents very young buds, and I refer it to *Elaeocarpus polystachyus,* Wall., a species previously known from Malacca and Singapore, with some doubt. It differs from our material representing Wallich's species in its very densely tawny-tomentose branchlets petioles and midrib, on the lower surface of the leaves. It is, at least, very close to Wallich's species, although mature material may show it to be specifically distinct.

Elaeocarpus gambir, Becc. Nelle Foreste di Borneo (1902) 594.

Elaeocarpus stipularis, Mast. in Hook. f. Fl. Brit. Ind. **I** (1874) 404; King in Journ. As. Soc. Beng. **60^2** (1891) 123, non Blume.

SARAWAK, Baram District, Miri River, *Hose 73;* Baram, *Hose 321;* Lundu, *Foxworthy 46;* near Kuching, *Native collector 121, 123, 410, 735, 1501, 2570* (Bur. Sci.).

The above specimens were all originally identified as *Elaeocarpus stipularis,* Blume, and conform to our large series of specimens, so named, from the Malay Peninsula. However, Koorders and Valeton* state that the Javan species is not the same as the one from the Malay Peninsula described by Masters, and the form figured by Koorders† is apparently distinct from that of the Malay Peninsula and Borneo. *Elaeocarpus gambir,* Becc., is very imperfectly described, but Dr. Beccari has kindly supplied me with material from the type, and also fragments of *Beccari, 3191* and *2486,* and a specimen collected by *Riedel* in Billiton, all of which apparently represent the same species.

Elaeocarpus beccarii, Aug. DC. in Bull. Herb. Boiss. II **3** (1903) 367.

The type of this is *Beccari 540,* from Sarawak, a fragment of which has kindly been sent to me by Dr. Beccari. The species is represented by the following specimens: *Native collector 124, 125, 1500, 1960* (Bur. Sci.), *Sarawak Museum 97,* with the native name *sanga dudok,* and a specimen collected May 11, 1893, from Kuching, collector not indicated.

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* Bijdr. Boomsoort. Java **I** (1894) 251.

† Atlas Baumarten Java **3** (1914) *fig. 425.*

PASSIFLORACEAE.

Passiflora, Linnaeus.

Passiflora laurifolia, Linn. Sp. Pl. (1753) 956.

BRITISH NORTH BORNEO, Sandakan, *Villamil 245 bis,* January, 1917, cultivated and wild; Jesselton, *Mrs. Clemens 9696,* December 15, 1915 "cultivated?"

This American species has long been cultivated in the Malayan region; it is apparently spontaneous in British North Borneo.

Passiflora foetida, Linn. Sp. Pl. (1753) 959.

BRITISH NORTH BORNEO, Jesselton, *Mrs. Clemens 9616*: Sarawak, Baram, *Hose 89, Foxworthy 481.*

This American species is apparently thoroughly established in parts of Borneo as it is in the Indo-Malayan region generally.

LECYTHIDACEAE.

Barringtonia, Forster.

Barringtonia curranii, Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 211.

BRITISH NORTH BORNEO, Kiau, *Mrs. Clemens 10139, 10213, s. n.,* November, 1915.

A species previously known only from Palawan.

Barringtonia conoidea, Griff. Not. **4** (1854) 656.

Barringtonia alata Wall. Cat. (1831) no. 3633, *nomen nudum.*

Butonica alata Miers in Trans. Linn. Soc. Bot. **1** (1875) 70, *t.* 14, f 10-15.

SARAWAK, Lundu, *Foxworthy 6,* May, 1908, in shallow water along a tidal stream, Malay *manga putat;* Dyak *putat laut.*

Burma, Malacca, Perak.

Barringtonia dolichobotrys, sp. nov. § *Butonica.*

Arbor glabra, circiter 15 m. alta, ramulis teretibus, rugosis, circiter 1 cm. diametro; *foliis* confertis, coriaceis, oblongo-oblanceolatis, utrinque nitidis, usque ad 30 cm. longis, acutis ad subrotundatis, longe petiolatis, basi angustatis, cuneatis, margine leviter revolutis, integris, nervis utrinque circiter 12 supra impressis, subtus valde prominentibus; *spicis* usque ad 1 m. longis, pendulis, rhachibus circiter 1 cm. diametro; *floribus* sessilibus, circiter 6.5 cm. diametro; *calycibus* circiter 3 cm. longis, teretibus, lobis 4 vel 5, haud imbricatis, lanceolatis ad ovatis, subacutis, subcoriaceis, circiter 1.5 cm. longis; *petalis* 4, oblongo-obovatis, 4 cm. longis, subcoriaceis, recurvatis, obtusis.

A glabrous tree about 15 m. high, the ultimate branchlets about 1 cm. in diameter, brownish, prominently rugose. Leaves crowded at the apices of the branchlets, coriaceous, in general oblong-oblanceolate, pale when dry, prominently shining on both surfaces, 20 to 30 cm. long, 6 to 11 cm. wide, apex acute to somewhat rounded, narrowed below to the cuneate base, margins somewhat revolute, entire; lateral nerves about 12 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, curved, anastomosing, the reticulations lax; petioles 4 to 5 cm. long, pale and striate except the very much thickened and prominently rugose dark-brown base. Spikes pendulous, up to 1 m. in length, the rachis nearly 1 cm. in diameter, when dry, pale, shining, prominently wrinkled. Flowers sessile, 6 to 7 cm. in diameter. Calyx about 3 cm. long, the tube terete, dark-brown when dry, 1 cm. in diameter, about 1.5 cm. long, widened upward, the lobes 4 or 5, lanceolate to ovate, coriaceous, somewhat spreading, acute to somewhat acuminate, as long as the tube, 1 to 1.7 cm. wide, not at all imbricate, apparently irregularly splitting from the closed bud. Petals 4, subcoriaceous, oblong-obovate, 4 cm. long, 2 cm. wide, recurved, obtuse. Stamens very numerous, united for the lower 5 mm., the free parts of the filaments about 4 cm. long, yellowish-white. Ovary 4-celled; ovules 3 to 6 in each cell. The disk-like annulus at the apex of the ovary inside the stamens is about 2 mm. high and 7 mm. in diameter. Style slender, about 4 cm. long. Fruits unknown.

British North Borneo, Sandakan, *Villamil 278,* December 5, 1916, in open places, altitude 90 meters. The trunk is 10 cm. in diameter and the calyx, when fresh, is brownish-red.

To this species I am disposed to refer a specimen from Sarawak, Kuching, May 22, 1893, collector not indicated. In this specimen, which is very imperfect, the leaves are rounded at the apex and up to 13 cm. in length. I have placed the species in the section *Butonica* as even in flowers with the petals not at all expanded the calyx-lobes are not at all imbricate, and the lobes all present more or less torn margins, indicating that the calyx in bud was entirely closed, in anthesis irregularly splitting into 4 or 5 lobes. From *Barringtonia macrostachya,* Kurz, of the section *Stravadium,* it is at once distinguished by its much larger buds and flowers.

Barringtonia dolichophylla, sp. nov.

Arbor glabra; *foliis* oblanceolatis, crasse coriaceis, usque ad 75 cm. longis, in siccitate pallidis, utrinque nitidis, integris, basi gradatim angustatis, costa utrinque valde incrassata, nervis utrinque circiter 40, prominentibus; *spicis* ut videtur elongatis; *floribus* 4-meris, circiter 7 cm. diametro; *calycis* 3.5 cm. longis, lobis 4, oblongo-ovatis, acutis, coriaceis, tubo subaequalibus; *petalis* 4, oblongis ad oblongo-lanceolatis, 4.5 cm. longis, obtusis; *ovario* 4-loculare.

A glabrous tree. Leaves oblanceolate, thickly coriaceous, pale and shining on both surfaces when dry, up to 75 cm. long and 10 cm. wide, entire, gradually narrowed in the lower one-half or two-thirds, the lamina narrowly decurrent nearly to the base of the petiole, the midrib very much thickened and prominent on both surfaces, on the lower surface toward the base 8 mm. thick; lateral nerves about 40 on each side of the midrib, very prominent, curved, anastomosing, the reticulations more distinct on the upper than on the lower surface; petioles 1 cm. thick, dark-brown, rugose, the wingless portion but 2 cm. long. Spikes apparently elongated and many-flowered. Flowers 4-merous, sessile, about 7 cm. in diameter. Calyx 3.5 cm. long, terete, somewhat urceolate, the tube 2 cm. long and 8 mm. thick, the lobes 4, coriaceous, oblong-ovate, acute, 1.4 to 1.7 cm. long, about 1.1. cm. wide, not imbricate. Petals 4, oblong to oblong-lanceolate, 4.5 to 5 cm. long, 1.5 to 1.7 cm. wide, rather thin, obtuse. Stamens very numerous, their filaments united for the lower 5 mm., the free parts about 4 cm. in length. Ovary 4-celled. Style 5 cm. long.

SARAWAK, Baram District, Miri, *Hose 610,* April 20, 1895.

A most characteristic species manifestly belonging in the same group with *B. dolichobotrys*. It is well characterized among all hitherto described species of *Barringtonia* by its greatly elongated, thickly coriaceous, entire, many-nerved leaves which taper gradually to the base. My specimen does not present the apical portion of the leaves, and only a fragment of the spike. The axis of the spike is pale, much wrinkled, and about 5 mm. in diameter.

MYRTACEAE.

Eugenia, Linnaeus.

This genus is enormously developed in Borneo, as in other parts of the Malayan region, and apparently here, as in other parts of the tropical Orient, a very high percentage of the species are of local occurrence. Up to the present time about forty species of the genus have been described from Bornean material, chiefly by Korthals, Blume, and Miquel, but some of the species proposed by Korthals are scarcely intelligible without an examination of his types, and some of his types are apparently no longer extant, judging by the fact that Miquel was unable to determine the status of several of the species. In our own collections of Bornean material about 60 distinct species are represented, but some of the specimens are not in condition for identification. With nearly 100 distinct species in the Malay Peninsula, over 70 in Java, and more than 175 in the Philippines, it is not at all surprising that so many should be found in Borneo. It is confidently expected that when the flora of Borneo shall have been more thoroughly studied, the list of Bornean species of *Eugenia* will be found well to exceed 100 distinct forms. In the present paper I have described as new those forms that appear to me to represent species previously undescribed, and have credited a number of species already described by other authors from extra-Bornean material to the Island.

In the present study of this Bornean material, as in my past studies of Philippine representatives of the genus, I have placed all under *Eugenia, sensu latiore,* as it is absolutely impossible to distinguish definitely between *Eugenia, Jambosa,* and *Syzygium,* as genera, on account of the very large number of intermediate forms. Occasionally species are found, for which no subgenus or section has ever been proposed, that differ more markedly from *Eugenia* § *Eu-eugenia* than do *Jambosa* and *Syzygium,* yet it seems to be illogical to propose new generic names for such forms; a good example of these is *Eugenia paradoxa,* Merr., described below. Blume attempted to distribute the Malayan species of *Eugenia* into a number of genera, such as *Syzygium, Jambosa, Strongylocalyx, Gelpkea, Cleistocalyx, Clavimyrtus, Microjambosa,* etc., but his proposition has not met with the approval of other botanists. In *Eugenia* as in other polymorphous groups, such as *Loranthus,* there seems to be no middle ground. The botanist must either accept the genus in its broadest sense or, as van Tieghem has proposed for *Loranthus,* divide it into a very large number of genera that can be distinguished from one another only by a critical study of each individual species. *Eugenia* as such, is a strongly marked group, and is always easily recognizable, and it seems best to treat all the species under this name. Niedenzu's division of the group into *Eugenia, Jambosa,* and *Syzygium* is certainly untenable. In the present paper I have placed those species with free petals in the section *Jambosa,* no matter if the petals are calyptrate, so long as they are not united and those species that have united calyptrate petals in the section *Syzygium.*

Eugenia coralina, sp. nov. § *Jambosa.*

Arbor glabra, ramis ramulisque teretibus; *foliis* oppositis, coriaceis, ellipticis, usque ad 12 cm. longis, in siccitate pallidis vel pallide viridibus, nitidis, perspicue obtuseque acuminatis, basi acutis vel decurrento-acuminatis, supra impresso-punctatis, subtus glandulosis; nervis primariis utrinque circiter 20, tenuibus, patulis, rectis, haud prominentibus, quam secundariis vix magis distinctioribus; *inflorescentiis* terminalibus, corymbosis, circiter 5 cm. longis, e basi ramosis, ramis plerisque trichotomis cum axin ramulosque rugosis more coralii, brunneis; *floribus* 5-meris, obovoideis, 2.5 mm. longis, breviter pedicellatis, ad apices ramulorum densissime confertis; *petalis* concavis, orbicularibus, exterioribus 2 mm. diametro, interioribus minoribus, liberis, calyptratim deciduis.

A glabrous tree, the branches and branchlets terete, the former dark-brown, somewhat wrinkled, the latter brown, striate or wrinkled, the ultimate ones 2 to 3 mm. in diameter. Leaves opposite, coriaceous, elliptic, 10 to 12 cm. long, 5 to 6.5 cm. wide, the apex rather prominently obtuse-acuminate, the base acute or decurrent-acuminate, margins recurved, when dry pale or pale-greenish, somewhat shining, the upper surface distinctly pitted, the lower glandular; primary lateral nerves slender, indistinct, about 20 on each side of the midrib, spreading, straight, scarcely more prominent than are the secondary ones and the reticulations, about equally distinct on both surfaces, anastomosing with the slender marginal nerves about 2 mm. from the edge of the leaf; petioles about 5 mm. long. Inflorescence terminal, corymbose, branched from the base, the branches normally trichotomous, the axis, branches, and branchlets brown or somewhat reddish-brown, peculiarly rugose and coral-like. Flowers very numerous, densely crowded at the tips of the ultimate branches forming subcapitate glomeri 8 to 10 mm. in diameter, the buds obovoid, 2.5 mm. long, the pedicels about 1 mm. long, the bracteoles obsolete or nearly so. Calyx tube 2 mm. long, narrowed below, black when dry, terete, shining, the teeth 5, about 1 mm. wide and 0.3 mm. long, obtuse. Petals calyptrate but not connate, the outer one concave, orbicular, 2 mm. in diameter, the other four closely imbricate within it, smaller, easily separable, 1 to 1.5 mm. in diameter. Stamens numerous, inflexed in bud.

SARAWAK, *Native collector 1869* (*Bur. Sci.*).

In leaf-form and texture, but not in color, this species resembles *Eugenia capitata*, Merr., but is entirely different in its inflorescence and in its smaller flowers. It is well characterized by the rugose, brown or reddish-brown coral-like axis branches and branchlets of its inflorescence and its densely disposed flowers.

Eugenia capitata, sp. nov. § *Jambosa.*

Arbor glabra, ramis ramulisque teretibus; *foliis* oppositis, ellipticis ad ovato-ellipticis, coriaceis, usque ad 11 cm. longis, perspicue obtuseque acuminatis, basi rotundatis ad subacutis, supra nitidis, castaneis, dense puncticulatis, subtus brunneis, glandulosis, nervis utrinque numerosis, densis, tenuibus, indistinctis; *inflorescentiis* terminalibus et in axillis superioribus, densissime multifloris; *floribus* omnibus sessilibus in capitulis 1.5 ad 3 cm. diametro dispositis, 5-meris; *alabastro* oblongo-obovoideo, 5 ad 6 mm. longo, *calycis* dentibus brevibus, latis, rotundatis; *petalis* 5, valde imbricatis, exterioribus majoribus, 2 ad 3 mm. diametro, haud connatis sed calyptratim deciduis.

A glabrous tree, the branches and branchlets terete, pale-brownish, smooth, or the thin bark on the branches forming flakes, the ultimate branchlets about 2.5 mm. in diameter, thickened at the nodes. Leaves opposite, elliptic to ovate-elliptic, coriaceous, 9 to 11 cm. long, 4.5 to 6 cm. wide, the apex prominently and rather abruptly acuminate, the acumen about 1 cm. long, blunt, the base rounded to somewhat acute, margins slightly recurved, the upper surface smooth, prominently shining, castaneous, minutely and rather densely impressed-puncticulate, the lower surface dull, brown or reddish-brown, glandular; nerves numerous, slender, obscure, about equally prominent on both surfaces, the primary ones about 30 on each side of the midrib, spreading, scarcely more distinct than are the secondary ones and the reticulations, uniting with the equally obscure marginal nerves about 1 mm. from the edge of the leaf; petioles dark-brown, 7 to 10 mm. long. Inflorescences terminal and in the uppermost axils, the flowers very numerous, crowded in dense globose heads 1.5 to 3 cm. in diameter formed of the greatly thickened and shortened branches of the inflorescence. Buds all sessile, oblong-obovoid, 5 to 6 mm. long, each group of two, or more usually three, flowers subtended by a whorl of broadly-ovate to oblong-ovate, obtuse to acute bracts and bracteoles, these coriaceous, castaneous, 1 to 1.5 mm. long. Calyx-tube cylindric or slightly angled by compression, narrowed below, dark-brown, shining, slightly rugose, the lobes 5, 0.5 to 0.8 mm. long, about 1.5 mm. wide, rounded. Petals 5, free, orbicular, prominently imbricate, concave, the outer one 2.5 to 3 mm. in diameter, the inner four closely imbricate within the outer one but not at all connate, free, falling as a calyptra, 2 to 2.5 mm. in diameter. Filaments numerous, inflexed.

SARAWAK, Santubong, *Native collector 2309* (*Bur. Sci.*), February-June, 1914, near the seashore, the flowers white.

A species at once recognizable by its dense, globose, capitate inflorescences. In appearance it is distinctly like various species of *Syzygium* with densely arranged obscure nerves, and would certainly be placed in *Syzygium* by some authors. As the petals are not at all united I have placed it in the section *Jambosa.*

Eugenia kiauensis, sp. nov. § *Jambosa.*

Arbor glabra, ramis teretibus vel indistincte 4-angulatis, crassis, ultimis circiter 6 mm. diametro, pallide brunneis; *foliis* oppositis, sessilibus, usque ad 25 cm. longis, coriaceis, oblongo-ellipticis, apice acute acuminatis, basi leviter auriculato-cordatis, nervis utrinque circiter 20, subtus prominentibus, anastomosantibus; *inflorescentiis* terminalibus, circiter 7 cm. longis, e basi ramosis, corymbosis; *floribus* magnis, circiter 4 cm. diametro, sessilibus, plerumque in triadibus dispositis; *calycis* tubo obconico circiter 1 cm. longo, lobis 4 orbiculari-reniformibus persistentibus prominentibus.

A glabrous tree, the branches and branchlets terete or somewhat 4-angled, pale-brownish, the ultimate ones about 6 mm. in diameter. Leaves opposite, sessile, coriaceous, oblong-elliptic, 18 to 25 cm. long, 7 to 9.5 cm. wide, narrowed upward to the subacutely acuminate apex, the base rounded and somewhat auriculate-cordate, the upper surface pale-olivaceous and shining when dry, the lower paler, typically eglandular; lateral nerves about 20 on each side of the midrib, rather distant, spreading, slightly curved, anastomosing with the equally distinct, somewhat arched, marginal nerves 3 to 4 mm. from the edge of the leaf, the reticulations lax, indistinct. Inflorescences terminal, corymbose, branched from the base, about 7 cm. long, the branches rather stout, brown, rugose, 4-angled, typically trichotomous, the flowers in triads at the tips of the branchlets. Flowers sessile, white, 4-merous, about 4 cm. in diameter. Calyx-tube obconic, brown when dry, terete, about 1 cm. long and nearly as wide at the top, the lobes 4, reniform-orbicular, rounded, prominently punctate, persistent, about 6 mm. long and 9 mm. wide. Petals 4, orbicular to broadly elliptic, prominently glandular, rounded, 11 to 13 mm. long. Stamens indefinite, their filaments 2 to 2.4 cm. long. Style about 2 cm. long.

BRITISH NORTH BORNEO, Mount Kinabalu, Kiau, *Mrs. Clemens 10132*, November 8, 1915. Probably referable here is *Mrs. Clemens 11104* from the trail to the Marai Parai Spur, December 3, 1915, but in this specimen the leaves are distinctly glandular on the lower surface.

By the various keys to Malayan species of *Eugenia,* this comes in the group with *Eugenia formosa,* Wall., and *E. javanica,* Lam., but in spite of its large flowers and sessile, somewhat auriculate-cordate, rather large leaves, is not really very closely allied to these species.

Eugenia paradoxa, sp. nov. § *Jambosa* (*Cleistocalyx*).

Arbor glabra, ramis griseis teretibus, ramulis junioribus brunneis teretibus vel leviter compressis; *foliis* oblongo-ellipticis, sessilibus vel brevissime petiolatis, usque ad 9 cm. longis, coriaceis, apice rotundatis, basi rotundatis vel leviter cordatis, subtus puncticulatis, nervis utrinque 10 ad 14, tenuibus, obscure anastomosantibus; *inflorescentiis* axillaribus terminalibusque, brevibus, paucifloris; *floribus* fasciculatis vel racemose dispositis, sub anthesin circiter 1.8 cm. longis; *alabastro* obovoideo circiter 1 cm. longo, deorsum angustato; *calycis* superiore parte calyptratim decidua; *petalis* 4, liberis; *staminibus* numerosissimis, filamentis 10 ad 12 mm. longis.

A glabrous tree, the branches pale-gray, terete, the youngest branchlets brown, somewhat compressed or terete, 2 mm. in diameter or less. Leaves opposite, coriaceous, oblong-elliptic, 6 to 9 cm. long, 2.5 to 3.5 cm. wide, apex rounded, base rounded or slightly cordate, sessile or nearly so, subolivaceous or brownish when dry, somewhat shining, the upper surface obscurely pitted, the lower glandular-punctate; lateral nerves 10 to 14 on each side of the midrib, slender, not prominent, obscurely anastomosing. Flowers axillary and terminal, fascicled or in short, few-flowered racemes, the inflorescences not exceeding 2 cm. in length. Buds about 1 cm. long, obovoid, narrowed below into the distinct pseudo-stalk, terete, brown, glandular, the calyx-tube at the mouth 6 to 7 mm. wide, in bud closed by the calyptra which apparently represents the calyx-lobes, the calyptra orbicular in outline, 7 mm. in diameter, radiate-reticulate, subconic, obscurely apiculate, when fallen leaving the truncate calyx-rim. Petals 4, free, orbicular to obovate, 4 to 4.5 mm. long, falling with the calyptra (top of the calyx) but not at all united with it. Stamens very numerous, their filaments 10 to 12 mm. long, the flower in full anthesis about 1.8 cm. long and wide.

SARAWAK, *Native collector 365* (*Bur. Sci.*).

This species is remarkable in its floral structure, in the calyptrate calyx resembling *Eugenia operculata*, Roxb., and the Philippine *E. clausa*, C. B. Rob., but remote from both of these in its vegetative and inflorescence characters. *Eugenia operculata*, Roxb., is placed in the section *Syzygium*, where the present species cannot belong because its petals, although falling as a calyptra inside the apex of the calyx, are entirely free. The three species, *Eugenia operculata, E. clausa*, and *E. paradoxa* are more distinct from *Eugenia* (§ *Eueugenia*), *Jambosa*, and *Syzygium*, which some authors maintain as distinct genera, than are these sections (or genera) from each other, yet unless the genus *Eugenia* be split up into very numerous genera distinguished from each other by very minor characters, there is no warrant for considering the species above described, and the others discussed herewith, as a distinct generic type.

Eugenia elliptilimba, sp. nov. § *Jambosa*.

Species *E. grandi* similis, sed differt floribus multo minoribus circiter 6 mm. longis, et calycis tubo circiter 2.5 mm. diametro; *ramis* ramulisque teretibus; *foliis* coriaceis, ellipticis ad late oblongo-ellipticis, usque ad 18 cm. longis, apice breviter obtuseque acuminatis, basi leviter rotundatis et paullo decurrento-acuminatis, in siccitate castaneis vel atro-brunneis, nitidis, nervis primariis utrinque circiter 20 distinctis juxta marginem distincte anastomosantibus; *inflorescentiis* terminalibus, corymbosis, pedunculatis, circiter 10 cm. longis; *floribus*

5-meris, plerumque in triadibus dispositis, anguste oblongo-obovoideis; *calyce* deorsum angustato, basi cuneato, leviter longitudinaliter striato, truncato; *petalis* 5, liberis, imbricatis, concavis, exterioribus majoribus.

A glabrous tree, the branches and branchlets terete or the latter slightly compressed, brown to dark-brown, smooth. Leaves opposite or subopposite, elliptic to broadly oblong-elliptic, coriaceous, 12 to 18 cm. long, 5.5 to 8 cm. wide, apex shortly and bluntly acuminate, base somewhat rounded and slightly decurrent-acuminate, not punctate, the upper surface castaneous or dark-brown when dry, shining, the lower paler; primary lateral nerves about 20 on each side of the midrib, distinct, spreading, slightly curved, anastomosing with the equally distinct marginal nerves about 3 mm. from the edge of the leaf, and with a much less distinct additional marginal nerve closer to the edge of the leaf, the secondary nerves and reticulations rather lax, distinct on both surfaces; petioles 5 to 8 mm. long. Panicles terminal, peduncled, corymbose, about 10 cm. long including the peduncle, 6 to 8 cm. wide, the branches mostly trichotomous, the flowers mostly in triads at the apices of the branchlets. Flowers 5-merous, including the pseudostalk about 6 mm. long, dark-brown when dry. Calyx, in bud, narrowly oblong-obovoid, base cuneate, the limb truncate, about 2.5 mm. wide, longitudinally striate. Petals 5, free, strongly imbricate, orbicular, concave, the outer one 2.5 mm. in diameter, covering the somewhat smaller inner ones, all falling as a whole but not at all united. Stamens 40 to 50, their filaments about 2.5 mm. long.

SARAWAK, *Native collector 254* (*Bur. Sci.*).

In general appearance and especially in its vegetable characters this species closely resembles *Eugenia grandis*, Wight, to which it is apparently closely allied. It is distinguished by its much smaller flowers.

Eugenia castanea, sp. nov. § *Jambosa.*

Arbor glabra, ramulis exceptis inflorecentiisque minute castaneo-puberulo-papillatis; *ramis* teretibus cortice lamellato facile secedente tectis, ramulis junioribus plerumque 4-angulatis; *foliis* oppositis, oblongis ad oblongo-ellipticis, castaneis vel supra atro-castaneis, nitidis, usque ad 14 cm. longis, epunctatis, perspicue abrupte obtuseque acuminatis, basi acutis, nervis primariis utrinque circiter 25, distinctis cum secondariis in nervum inframarginalem confluentibus; *inflorescentiis* plerumque terminalibus, corymbosis, circiter 7 cm. longis, pedunculatis vel e basi ramosis; *floribus* 5-meris, plerumque in triadibus dispositis; *calyce* circiter 6 mm. longo, anguste oblongo-obovoideo, deorsum valde angustato.

A tree, glabrous except the distinctly and rather densely castaneous-puberulent-papillose branchlets and inflorescences. Branches terete, reddish-brown or castaneous, slender, the bark separating in elongated flakes, the branchlets usually 4-angled, smooth, castaneous. Leaves opposite, subcoriaceous, oblong to oblong-elliptic, 6 to 14 cm. long, 3 to 6 cm. wide, castaneous and shining on both surfaces or the upper surface atro-castaneous, not punctate, the apex with a prominent obtuse acumen about 1 cm. long, base acute; primary lateral nerves about 25 on each side of the midrib, distinct as are the secondary ones and the reticulations, spreading, anastomosing with the marginal veins about 2 mm. from the edge of the leaf; petioles dark-brown or nearly black, 2 to 3 mm. long. Panicles corymbose, mostly terminal, usually about 7 cm. long, peduncled or branched from the base, uniformly and minutely puberulent-papillose, the branches mostly trichotomous, the flowers all sessile in triads on the ultimate branchlets. Flowers white, 5-merous, the calyx, including the pseudo-stalk, about 6 mm. long, glabrous or nearly so, terete, dark-brown when dry, 2 to 3 mm. wide at the throat, much narrowed below, the limb with 5 very shallow, rounded lobes, the subtending bracteoles oblong, less than 1 mm. long. Petals imbricate in a calyptra, concave, free, 3 to 4 mm. in diameter. Stamens indefinite, 6 to 8 mm. long.

SARAWAK, Baram District, Baram, *Hose 359* (type), November 18, 1894; Miri, *Hose 675* April 20, 1895; Mount Poe, *Foxworthy 223,* May 24, 1908.

I am inclined to refer here also *Native collector 815, 1170, 2178* (*Bur. Sci.*), these specimens differing from the type chiefly if not only in having the ultimate branchlets terete instead of 4-angled.

Eugenia castanea is well characterized by the flaky bark on the branches, its short-petioled, castaneous, densely nerved, eglandular leaves which are abruptly and obtusely acuminate, and its puberulent-papillose branchlets and inflorescences.

Eugenia kuchingensis, sp. nov. § *Jambosa.*

Arbor glabra, ramis ramulisque teretibus; *foliis* coriaceis, in siccitate bruneis, ellipticis ad late oblongo-ellipticis, usque ad 20 cm. longis, obtuse acuminatis, basi acutis vel leviter acuminatis, eglandulosis, nervis utrinque circiter 15, tenuibus, rectis, patulis, cum venis sub margine anastomosantibus, reticulis obscuris vel saltem in pagina superiore obsoletis; *paniculis* subcorymbosis, terminalibus, usque ad 10 cm. longis; *floribus* circiter 1.5 cm. longis, in ramulis ultimis subcapitatis dispositis; *calycis* tubo turbinato 8 mm. longo, lobis inaequalibus.

A glabrous tree, the branches and branchlets terete, usually grayish. Leaves coriaceous, elliptic to broadly oblong-elliptic, 13 to 20 cm. long, 5 to 8 cm. wide, coriaceous, shining, subequally narrowed to the blunt-acuminate apex and to the acute or somewhat decurrent-acuminate base, the upper surface olivaceous to blackish-brown, the lower surface usually castaneous when dry; lateral nerves about 15 on each side of the midrib, slender, spreading, nearly straight, usually not prominent on either surface, anastomosing with the single pair of marginal nerves at 3 to 4 mm. from the edge of the leaf, the reticulations lax, indistinct, usually obsolete on the upper surface; petioles stout, rugose, usually black when dry, 1 to 1.5 cm. long. Panicles terminal, subcorymbose, 8 to 10 cm. long, branched from the base, the flowers subcapitately arranged, 3 to 6 at the tip of each ultimate branchlet, about 1.5 cm. long, sessile. Calyx turbinate, narrowed below, sometimes longitudinally striate, about 8 mm. long and 6 mm. wide, the lobes 4, unequal, reniform.

SARAWAK, Kuching and vicinity, *Native collector 258* (type), *813, 1625, 1882, 2138* (*Bur. Sci.*), *Hewitt,* November, 1905; Santubong, *Hewitt,* January, 1907; Samatan, *Foxworthy 152,* May, 1908.

Judging from the number of collections this species must be common in Sarawak; native names recorded are *uba jambu* and *uba nyali.* Its alliance is manifestly with *Eugenia grandis.* Wight, from which it is at once distinguished by its obsure reticulations and the entire absence of the second pair of marginal veins. The forms described by Blume as *Jambosa grandis* and *Jambosa firma* are apparently both referable to *Eugenia grandis,* Wight, but *Jambosa urceolata,* Korth., described from Bornean material, reduced by Blume as a variety of *J. grandis,* is interpreted by King as an entirely different species, *Eugenia urceolata,* (Korth.) King.

Eugenia grandis, Wight. Ill. **2** (1841-50) 17.

Jambosa grandis, Blume, Mus. Bct. 1 (1849) 108.
Jambosa firma, Blume, l.c.

SARAWAK, Samatan, *Foxworthy 173,* back of the mangrove, May, 1908, Malay *uba.*

Burma to Penang, the Malay Peninsula, and Singapore.

Eugenia sarawacensis, sp. nov.

Arbor glabra, ramis ramulisque teretibus; *foliis* oppositis, coriaceis, oblongo-ovatis ad oblongo-ellipticis, usque ad 9 cm. longis, utrinque subaequaliter angustatis, basi acutis, apice obtuse acuminatis, in siccitate brunneis, nitidis, eglandulosis vel subtus obscurissime puncticulatis, basi tenuiter 5-plinerviis, paribus interioribus majoribus inter lateralibus haud arcuatis, nervis lateralibus utrinque circiter 7 irregularibus adscendentibus distinctis; *paniculis* terminalibus, circiter 7 cm. longis, e basi ramosis, corymboso-cymosis, dichotome vel trichotome ramosis; *floribus* 4-meris, 3 ad 6 in ramulis ultimis dispositis, alabastro oblongo-obovoideo, circiter 5 mm. longo.

A glabrous tree, the branches and branchlets terete or the latter compressed at the nodes, brown or pale-brownish, smooth. Leaves opposite, coriaceous, oblong-ovate to oblong-elliptic, 7 to 9 cm. long, 3.5 to 5 cm. wide, subequally narrowed to the acute base and to the blunt acuminate apex, when dry brown, shining, the lower surface paler than the upper, eglandular or very obscurely puncticulate, the base slenderly 5-plinerved, the inner pair more prominent than the outer, extending to the apex, scarcely or not at all arched between the ends of the lateral nerves, the latter usually about 7 on each side of the midrib, ascending, irregular, anastomosing, the reticulations rather lax, distinct; petioles 5 to 8 mm. long. Panicles terminal, lax, about 7 cm. long, branched from the base, corymbose-cymose, dichotomously or trichotomously branched, the flowers 4-merous, 3 to 6 at the tip of each ultimate branchlet, slightly angular, the buds oblong-obovoid, about 5 mm. long including the pseudo-stalk, brown and somewhat shining when dry. Calyx-lobes 4, broad, obscure.

SARAWAK, Matang Road, *Native collector 812, 816* (*Bur. Sci.*), July 1 and 3, 1911.

This species is apparently as closely allied to *Eugenia mülleri*, Miq., as to any other species, but differs conspicuously in its distinctly acuminate leaves.

Eugenia litseaefolia, sp. nov.

Arbor glabra, ramis ramulisque teretibus; *foliis* oppositis vel suboppositis, oblongo-obovatis, coriaceis, usque ad 11 cm. longis, obtusis ad breviter obtuse acuminatis, basi acutis, subtus glaucescentibus, eglandulosis, nervis utrinque circiter 6 adscendentibus irregularibus laxe anastomosantibus; *paniculis* terminalibus, laxis, circiter 10 cm. longis; *floribus* paucis, sessilibus, in alabastro ovoideo-ellipsoideis, circiter 3 mm. longis.

A glabrous tree, the branches and branchlets terete, smooth, the former pale-brownish, the latter dark-colored, 1.5 to 2 mm. in diameter. Leaves opposite or subopposite, coriaceous, oblong-obovate, 9 to 11 cm. long, 3 to 4 cm. wide, apex obtuse to shortly blunt-acuminate, base acute, the upper surface brownish, somewhat shining, the lower distinctly glaucescent, eglandular; lateral nerves about 6 on each side of the midrib, irregular, ascending, curved, laxly anastomosing, the reticulations very lax; petioles nearly black when dry, 1.5 to 2 cm. long. Panicles terminal, lax, about 10 cm. long, branched at or from near the base, the branches spreading, the lower ones up to 4.5 cm. long. Flowers few, all sessile, mostly in threes on the ultimate branchlets, the buds ovoid-ellipsoid, about 3 mm. long, black when dry, the calyx-limb with 4, shallow, broad, obscure lobes, young fruit ovoid, black when dry, crowned by the shallow calyx-lobes.

Sarawak, *Native collector 260* (*Bur. Sci.*).

The alliance of this species is apparently with *Eugenia mülleri*, Miq., from which it is distinguished by its leaves usually being more or less acuminate, never retuse at the apex, by being distinctly glaucous beneath, and by its sessile flowers. In aspect the leaves strongly resemble those of some species of *Litsea*.

Eugenia caudatilimba, sp. nov. § *Jambosa.*

Arbor glabra, ramis ramulisque tenuibus teretibus; *foliis* oblongo-ovatis, coriaceis, usque ad 9 cm. longis, caudato-acuminatis, basi acutis vel subrotundatis, in siccitate brunneis, supra parce impresso-punctatis, subtus glanduloso-puncticulatis, nervis utrinque circiter 15, obscuris, interdum obsoletis; *inflorescentiis* axillaribus terminalibusque, brevissimis, 5- ad 7-floris, cum floribus vix 1.5 cm. longis; *floribus* 4-meris, calycis tubo obconico, 5 mm. longo.

A glabrous tree, the branches and branchlets slender, terete, brown, the latter 1 to 2 mm. in diameter. Leaves opposite, brown when dry or the upper surface somewhat olivaceous, oblong-ovate, coriaceous, prominently caudate-acuminate, the acumen slender, obtuse, up to 1.5 cm. long, base acute to somewhat rounded, margins recurved, the upper surface slightly shining, sparingly impressed-punctate, the lower surface dull, glandular-puncticulate; lateral nerves slender, obscure, about 15 on each side of the midrib, sometimes obsolete; petioles brown, rugose, about 5 mm. long. Inflorescences very short, axillary and terminal, 5- to 7-flowered, the axis but 2 or 3 mm. long, the flowers crowded, racemes, 4-merous, including the stamens about 10 mm. long, their pedicels 1 to 3 mm. long. Calyx-tube obconic, terete, brown, 5 mm. long and wide, the lobes 4, spreading, broadly obovate, rounded, punctate, 4 mm. long, usually wider than long. Petals broadly ovate, 3.5 mm. long. Stamens indefinite, their filaments 7 to 9 mm. long.

Sarawak, without definite locality, *Native collector 1169* (*Bur. Sci.*).

The characteristic features of this species are its slender terete branchlets, its brown, coriaceous, prominently caudate-acuminate, obscurely nerved leaves which are sparingly pitted on the upper surface, and its very short, few-flowered, axillary and terminal inflorescences.

Eugenia punctilimba, sp. nov. § *Jambosa.*

Arbor glabra, ramis ramulisque teretibus; *foliis* obovato-oblongis ad oblongo-ellipticis, usque ad 7 cm. longis, obtusis vel rotundatis, basi acutis, supra distincte impresso-punctatis, sub-olivaceis, nitidis, utrinque concoloribus, leviter glanduloso-punctatis, nervis utrinque numerosis tenuibus densis; *inflorescentiis* terminalibus, 2 ad 3 cm. longis, pauciramosis, axi ramulisque plus minusve 4-angulatis crassis; *floribus* 5-meris, circiter 3 mm. longis, obovoideis, omnibus sessilibus, ad apices ramulorum dense confertis.

A glabrous tree, the branches and branchlets slender, terete, pale-brownish, or the very youngest branchlets obscurely 4-angled, 1.5 to 2 mm. in diameter. Leaves opposite, coriaceous, obovate-oblong to oblong-elliptic, 4 to 7 cm. long, 2 to 3.5 cm. wide, apex obtuse to rounded, base acute, margins slightly recurved, the upper surface subolivaceous, somewhat shining, distinctly pitted, the lower surface of the same color, somewhat glandular-punctate; lateral nerves slender, rather densely arranged, about 30 on each side of the midrib, straight, anastomosing with the marginal veins about 1 mm. from the edge of the leaf; petioles dark-brown, rugose, about 2 mm. long. Inflorescences terminal, 2 to 3 cm. long, usually peduncled, trichotomously branched, the axis and branches dark-brown, rather stout, usually 4-angled, the flowers sessile, densely crowded at the tips of the few branches, the inflorescences 2.5 to 3 cm. wide. Flowers apparently white, in bud obovoid, about 3 mm. long, the subtending bracteoles triangular-ovate, acute, 0.8 mm. long. Calyx-tube narrowed below, brown, somewhat shining when dry, the teeth 5, ovate, acute, 0.5 mm. long. Petals orbicular, 1.5 mm. in diameter, falling as a calyptra but easily separable. Stamens about 20, inflexed.

British North Borneo, Mount Kinabalu, Marai Parai Spur, *Mrs. Clemens 10888,* November 22, 1915 (type): Sarawak, Mount Merinjak, *Native collector 2514* (*Bur. Sci.*) Feb.-June, 1914.

This species is well characterized by its densely nerved, rather small, short petioled, obtuse to rounded leaves which are distinctly pitted on the upper surface, as well as by its short terminal inflorescences, the flowers all sessile and crowded at the tips of the branchlets.

Eugenia baramensis, sp. nov. § *Jambosa.*

Arbor glabra, ramis tenuibus teretibus, ramulis castaneis distincte 4-angulatis; *foliis* oblongo-ellipticis, subcoriaceis, usque ad 5 cm. longis, in siccitate castaneis, nitidis, prominente obtuse acuminatis, basi acutis, nervis primariis utrinque circiter 15 distinctis, nervis secundariis parallelis, reticulis subobsoletis; *inflorescentiis* axillaribus, depauperato-cymosis, paucifloris, 5 ad 10 mm. longis, vel floribus fasciculatis; *floribus* circiter 7 mm. longis (filamentis inclusis), in alabastro obovoideo.

A glabrous tree the branches slender, terete, pale, 2 mm. in diameter or less, the branchlets castaneous, distinctly 4-angled, the internodes 1 to 2 cm. long. Leaves opposite, subcoriaceous, oblong-elliptic, 3 to 5 cm. long, 1.3 to 2 cm. wide, subequally narrowed to the acute base and to the rather slenderly but obtusely acuminate apex, when dry castaneous, of about the same color on both surfaces, somewhat shining; primary lateral nerves about 15 on each side of the midrib, spreading, slightly curved, slender, anastomosing with the slender marginal nerves about 1 mm. from the edge of the leaf, the secondary ones much less prominent, parallel, the reticulations indistinct or subobsolete; petioles 2 to 4 mm. long. Flowers axillary, few, in short, depauperate, few-flowered cymes 1 cm. long or less, or sometimes in 3-flowered fascicles, the bracteoles ovate, acute, about 0.5 mm. long. Buds obovoid, about 3 mm. long, dark-brown when dry, the calyx-tube narrowed below, in anthesis 3 mm. long, about 3 mm. wide at the throat, the limb with 4, shallow, rounded, obscure lobes. Petals more or less cohering, orbicular, 2 mm. in diameter. Stamens indefinite, their filaments 4 to 5 mm. long.

SARAWAK, Baram District, Entoyut River, *Hose 399*, December, 1894.

This species is well characterized by its small, blunt-acuminate leaves which are castaneous when dry, and its few axillary flowers which are fascicled or disposed in depauperate cymes 1 cm. long or less. In size and appearance the flowers closely approximate to those of *Eugenia cymosa*, Lam.; but while the present species is apparently in the same general group as Lamarck's species, it is entirely different in its vegetative and inflorescence characters.

Eugenia heteroclada, sp. nov. § *Jambosa.*

Arbor glabra, ramis laevibus pallidis teretibus, ramulis prominente 4-angulatis anguste quadrialatis, internodiis ultimis sursum distincte incrassatis; *foliis* oppositis, brevissime petiolatis, lanceolatis ad oblongo-lanceolatis, usque ad 15 cm.

longis, acuminatis, basi rotundatis et leviter cordatis, nervis lateralibus utrinque circiter 10 valde prominentibus cum intramarginalibus anastomosantibus; *floribus* terminalibus, solitariis vel binis, mediocribus, distincte pedicellatis, 4-meris. calycis tubo obconico, circiter 1 cm. longo.

A glabrous tree, the branches smooth, terete, pale, slender, the branchlets 4-angled, narrowly 4-winged, the ultimate internodes 4 to 7 cm. long, distinctly thickened upward, often terete below, but always 4-angled and winged above. Leaves opposite, subcoriaceous, oblong-lanceolate to lanceolate, 10 to 13 cm. long, 2 to 3.8 cm. wide, narrowed upward to the rather slenderly acuminate apex, base rounded, slightly cordate, when dry rather pale, shining; primary lateral nerves about 10 on each side of the midrib, spreading, distant, slightly curved, very prominent on the lower surface, anastomosing with the equally prominent, slightly arched, marginal nerves at from 2 to 4 mm. from the margin; petioles brown, 2 mm. long or less. Flowers white, terminal, solitary or in pairs, sometimes in a two-flowered raceme, their pedicels about 5 mm. long, each pedicel subtended by two or three pairs of ovate-lanceolate, small, decussate bracts, the flowers subtended by a pair of similar bracteoles. Calyx-tube obconic, about 1 cm. long and wide, brown when dry, smooth, the lobes 4, spreading, reniform, 5 to 7 mm. wide; style about 2.5 cm. long.

BRITISH NORTH BORNEO, Mount Kinabalu, Kiau, *Mrs. Clemens 10127,* November 30, 1915.

The alliance of this species is manifestly with the Philippine *Eugenia phanerophlebia,* C. B. Rob., and the Javan *E. sexangulata,* Koord. & Val., differing from the former especially in its smaller, fewer-nerved leaves, smaller flowers and obconic, not cup-shaped calyx-tube, and from the latter by its few flowers, in its vegetative characters and in its 4- (not 6-) angled branchlets, the ultimate ones being distinctly winged. A striking character of the Bornean species is the upward thickening of the ultimate internodes, these usually terete or nearly so below, 4-angled and finally 4-winged in the thickened upper part.

Eugenia multibracteolata, sp. nov. § *Jambosa* (*Leptomyrtus,* Miquel).

Arbor parva, 3 ad 4 m. alta, glabra, ramis teretibus purpureo-brunneis, ramulis pallidis prominente 4-angulatis, internodiis sursum incrassatis et distincte 4-alatis; *foliis* crasse coriaceis, ovatis ad oblongo-ovatis, usque ad 11 cm. longis, obtuse acuminatis, basi late rotundatis et distincte cordatis, margine revolutis, brevissime petiolatis, nervis utrinque circiter 15 patulis indistinctis; *cymis* axillaribus terminalibusque,

usque ad 4 cm. longis; *floribus* circiter 8.5 mm. longis ad apicem ramulorum confertis sessilibus, bracteis bracteolisque involucrantibus; calyci deorsum angustato, rugoso, glaucescente, lobis 5, rariter 4, ovatis rotundatis, 2 ad 2.5 mm. longis.

A small straggling tree 3 to 4 m. high, entirely glabrous, the branches terete, 2 to 3 mm. in diameter, purplish-brown, smooth, shining, the younger ones with the remains of the flaky or stringy cortex of the branchlets, the branchlets distinctly thicker than the ultimate branches, pale-brownish, prominently 4-angled, the internodes thickened upward and distinctly 4-winged, the wings ending at the nodes in rounded auricles. Leaves opposite, thickly coriaceous, ovate to oblong-ovate, 9 to 11 cm. long, 4 to 5.5 cm. wide, brownish or pale-brownish when dry, sometimes slightly glaucous, the lower surface paler than the upper, obscurely glandular beneath, apex blunt-acuminate, base broadly rounded and distinctly cordate, margins recurved; lateral nerves about 15 on each side of the midrib, usually obscure, faintly anastomosing; petioles stout, 3 mm. long or less, reddish-brown, rugose, distinctly undulate-winged. Inflorescences axillary and terminal, cymose up to 4 cm. in length, the axis and branches prominently 4-angled, pale-brownish, the flowers all sessile, crowded at the apices of the branchlets, 5 to 7 on each branchlet, subtended by a prominent involucre of pale-brownish bracts and bracteoles, the bracts broadly ovate, obtusely acuminate, about 6 mm. long and 4 mm. wide, the bracteoles narrowly oblong, 6 mm. long, 2 to 3 mm. wide. Flowers 8 to 9 mm. long, the calyx-tube narrowed below, rugose when dry, not at all tuberculate, above about 3 mm. in diameter, the lobes 5, broadly ovate, rounded, 2 to 2.5 mm. long, two usually distinctly shorter than the other three. Petals orbicular, 3 mm. in diameter. Filaments 6 to 7 mm. long.

SARAWAK, Mount Santubong, *Native collector 2240* (*Bur. Sci.*) (type), June, 1914; *Foxworthy 443,* June 7, 1908, on the forested summit of a small peak, altitude about 300 meters, known to the Malays as *pala musu*.

A very characteristic species belonging in the group with *Eugenia zeylanica,* Wight, from which it is distinguished by its larger leaves and flowers, very prominet bracts and bracteoles, non-tuberculate calyces, and other characters. It is equally distinct from the other described forms in this small group.

Eugenia perparvifolia, sp. nov. § *Jambosa* (*Leptomyrtus*, Miquel).

Arbor parva, 3 ad 6 m. alta, glabra, ramis ramulisque tenuibus rubro-castaneis, ramis teretibus, ramulis distincte 4-angulatis; *foliis* ovatis ad ovato-lanceolatis, usque ad 1.4 cm.

longis, obtuse acuminatis, basi acutis, in siccitate brunneis vel pallidis, utrinque nitidis, nervis obsoletis; *floribus* in axillis superioribus fasciculatis, dense confertis, multibracteolatis, 5-meris, circiter 3 mm. longis; calycis glaucescentis longitudinaliter rugosi lobis ovatis, 1 ad 1.2 mm. longis, exterioribus majoribus.

A small glabrous tree 3 to 6 m. high, the branches and branchlets slender, castaneous or reddish-castaneous when dry, the branches terete, bark more or less flaky, the branchlets smooth, distinctly 4-angled, the internodes less than 1 cm. in length. Leaves coriaceous, opposite, ovate to ovate-lanceolate, 7 to 14 mm. long, 4 to 7 mm. wide, smooth, shining, brown or pale when dry, base acute, apex blunt-acuminate, the nerves and reticulations entirely obsolete, eglandular; petioles 1 mm. long or less. Flowers yellowish, crowded in dense fascicles in the upper axils, the fascicles about 5 mm. in diameter. Calyx about 3 mm. long, narrowed below, glaucous, longitudinally rugose, not at all verruculose, the lobes 5, ovate, acute to obtuse, 1 to 1.2 mm. long, the outer ones distinctly larger than the inner. Petals orbicular, about 1 mm. in diameter. Bracteoles subtending the flowers numerous, 1.5 to 2 mm. long, oblong-obovate to subspatulate, obtuse, more or less concave.

SARAWAK, Mount Santubong, *Foxworthy 454,* June 7, 1908, on a forested ridge, altitude about 300 meters, known to the Malays as *mortap.*

A species manifestly belonging in the same group as *Eugenia zeylanica,* Wight, for which Miquel proposed the section name *Leptomyrtus.* It is distinguished from all hitherto described forms of this group by its very small leaves, the nerves and reticulations being entirely obsolete. It is most closely allied to *Eugenia besukiensis,* (Hassk.) Merr., from which it is at once distinguished by its smaller entirely nerveless leaves.

Eugenia moultonii, sp. nov. § *Syzygium.*

Arbor glabra, ramis ramulisque laevibus stramineis, ramis teretibus, ramulis distincte 4-angulatis vel sulcatis; *foliis* oppositis, subcoriaceis, oblongis, usque ad 12 cm. longis, utrinque subaequaliter angustatis acuminatisque, margine revolutis, supra subolivaceis, subtus pallidis, glandulis jam oculo nudo distinctis, nervis primariis utrinque circiter 20, tenuibus, indistinctis, rectis; *inflorescentiis* axillaribus terminalibusque, 1 ad 2 cm. longis, paucifloris, inferioribus plerumque 3-floris, superioribus trichotomis, ramis 3-floris, bracteis bracteolisque prominentibus; *floribus* 4-meris, omnibus sessilibus, 3 ad 4 mm. longis; *calycis* tubo pallido, rugoso, deorsum leviter angustato, dentibus 4 late rotundatis.

A glabrous tree the branches and branchlets mostly straw-colored, the branches terete, the branchlets about 2 mm. in diameter, 4-angled or sulcate, nearly smooth. Leaves opposite, subcoriaceous, oblong, 7 to 12 cm. long, 2.5 to 4 cm. wide, subequally narrowed to the acuminate base and apex, the apex subacute, margins slightly recurved, the upper surface subolivaceous, slightly shining, minutely verruculose, the lower surface pale, the glands scattered, distinctly visible to the naked eye; primary lateral nerves about 20 on each side of the midrib, slender, obscure, scarcely more distinct than are the secondary ones, anastomosing with the equally obscure marginal nerves close to the edge of the leaf; petioles 10 to 12 mm. long. Cymes terminal and in the upper axils, 1 to 2 cm. long, few-flowered, the axillary ones mostly 3-flowered, the terminal ones trichotomous, each branch 3-flowered, the bracts oblong, coriaceous 3 to 4 mm. long, acute, somewhat keeled, the two bracteoles subtending each flower ovate or elliptic-ovate, rounded, somewhat concave, thickly coriaceous, 2 mm. long. Flowers all sessile, 4-merous. Calyx 3 to 4 mm. long, slightly narrowed below, subterete, rugose, pale when dry, 2 to 2.3 mm. in diameter at the throat, the lobes broad, rounded, 0.3 mm. long, 1.2 mm. wide. Petals united into a deciduous calyptra 2.5 mm. in diameter. Style 2 mm. long; stigma hemispheric, 0.6 mm. in diameter.

SARAWAK, Tabwan road and Rock road, *Native collector 255, 811* (*Bur. Sci.*), May and June, 1911, with the local names *malaban* and *malaban paya.*

A species readily recognizable by its short, few-flowered, axillary and terminal cymes, straw-colored branches and branchlets, and obscurely nerved, distinctly glandular-punctate leaves. It is named in honor of Captain J. C. Moulton, formerly Director of the Sarawak Museum, who supervised the work of our native collector.

Eugenia havilandii, sp. nov. § *Syzygium.*

Arbor glabra, circiter 15 m. alta, ramis ramulisque brunneis laevibus teretibus vel ramulis leviter compressis; *foliis* ellipticis, coriaceis, usque ad 13 cm. longis, utrinque acuminatis, in siccitate nitidis, brunneis vel supra atro-brunneis, densinerviis, subtus haud glandulosis, supra parce impresso-punctatis, nervis primariis utrinque circiter 30, tenuibus, utrinque quam secondariis vix magis distinctioribus; *inflorescentiis* terminalibus, corymbosis, 3 ad 4 cm. longis, e basi ramosis; *floribus* 5-meris, ad apices ramulorum confertis, omnibus sessilibus; *alabastro* obovoideo, circiter 4 mm. longo.

A glabrous tree about 15 m. high, the branches and branchlets smooth, brown, terete, or the latter 1.5 to 2 mm.

in diameter, slightly compressed. Leaves opposite, coriaceous, elliptic, when dry brown on both surfaces, the lower surface eglandular and paler than the upper which is usually dark-brown and sparingly impressed-punctate, 9 to 13 cm. long, 4 to 6.5 cm. wide, subequally narrowed to the acuminate base and apex, the apical acumen distinct, obtuse, the midrib impressed on the upper surface, very prominent on the lower, the lateral nerves slender, indistinct, densely arranged, the primary ones about 30 on each side of the midrib, about equally distinct on both surfaces and but slightly more prominent than are the secondary ones and the reticulations, anastomosing with the faint marginal nerves about 1 mm. from the edge of the leaf; petioles nearly black when dry, somewhat rugose, 5 to 7 mm. long. Panicles corymbose, terminal, 3 to 4 cm. long, branched from the base, the axis and branches somewhat 4-angled, brown, the latter mostly trichotomous, the flowers sessile, crowded at the apices of the ultimate branchlets, 3 to 6 on each branchlet. Buds obovoid, about 4 mm. long, dark brown when dry, the subtending bracteoles brown, ovate, acute to obtuse, 0.5 to 0.8 mm. long. Calyx-tube terete or somewhat angled by compression, narrowed below, the mouth 2.6 to 2.8 mm. in diameter, the limb with 5, short, obtuse, 0.2 mm. long teeth. Petals entirely united into a calyptra 2.6 to 2.8 mm. in diameter. Stamens numerous, the filaments about 5 mm. long.

SARAWAK, Kuching, Rock road, fifth mile, *Native collector 814* (*Bur. Sci.*), July 21, 1911, with the native name *ubah lawang*. I refer here also two sterile specimens, *Sarawak Museum 64, 78,* with the native names *samak ubah* and *ubah hatak*.

The alliance of this species is apparently with *Eugenia inophylla,* Roxb., from which it differs especially in its shorter inflorescences and distinctly smaller flowers. Named in commemoration of Dr. G. D. Haviland, formerly director of the Sarawak Museum.

Eugenia rufo-tomentosa, Gibbs in Journ. Linn. Soc. Bot. **42** (1914) 77.

Jambosa hirta, Korth. in Nederl. Kruidk. Arch. **1** (1847) 200, non *Eugenia hirta*, Berg.

BRITISH NORTH BORNEO, Kiau, Mount Kinabalu, and on Mount Kalawat, *Mrs. Clemens 9973, 11160, s. n.,* November and December, 1915.

This most characteristic endemic species is very similar to the Philippine *Eugenia ciliato-setosa,* Merr., of Northern Luzon, which differs notably from the Bornean species in its glabrous calyces. From the description I can see no reason for distinguishing *Jambosa hirta,* Korth., from *Eugenia rufo-*

tomentosa, Gibbs, Korthals's type being from Mount Sakoembang near Banjoewiran, Borneo; but Korthals's specific name is invalid in *Eugenia.*

Eugenia saligna, (Miq.) C. B. Rob. in Philip. Journ. Sci. **4** (1909) Bot. 392.

Jambosa saligna, Miq., Fl. Ind. Bat **1**^{1} (1855) 432.

Eugenia acuminatissima, Kurz in Journ. As. Soc. Beng. **46**^{2} (1855.) **67** non Miq., vec Berg.

Eugenia cumingiana, Vid. Phan. Cuming. Philip. (1885) 173.

SARAWAK, Samatan, *Foxworthy 143,* May, 1908, locally known as *uba puti;* Baram District, Miri River, *Hose 533,* February, 1895.

Eugenia cumingiana, Vid., a species originally described from Philippine material, has been reported from British North Borneo by Miss Gibbs. A cotype of Vidal's species is before me, and I can detect no differences between it and *Eugenia acuminatissima,* (Blume) Kurz. As the latter name is invalid in *Eugenia,* I have followed Robinson in accepting the name supplied by *Jambosa saligna,* Miq., Miquel's species having been reduced by Koorders and Valeton as a synonym of *Eugenia acuminatissima,* Kurz.

India to southern China through Malaya to tropical Australia.

Eugenia rugosa, (Korth.) comb. nov.

Syzygium rugosum, Korth. in Nederl. Kruidk. Arch. **1** (1848) 204; Walp. Ann. **2** (1851) 630.

Eugenia varians, Miq., Anal. Bot. Ind. 1 (1850) 21, pro parte.

SARAWAK, *Native collector 1775* (*Bur. Sci.*).

The specimen I have identified with Korthals' species, greatly resembles *Eugenia zeylanica,* Wight, but agrees with the short description of *Syzygium rugosum,* Korth., the type of which was from Borneo, and differs notably from *Eugenia zeylanica,* Wight, in the distinctly pitted upper surface of the leaves, and its smooth, not tuberculate calyces, characters indicated by Korthals. I do not consider that Miquel was correct in referring *Syzygium rugosum,* Korth., together with *Myrtus zeylanica,* Linn., *Eugenia spicata,* Lam., and *Syzygium zeylanicum,* DC., to *Eugenia varians,* Miq. Miquel later, Fl. Ind. Bat. **1**^{1} (1855) 437, referred *Syzygium rugosum,* Korth to *Jambosa? bracteata,* Miq., which is apparently a synonym of *Eugenia zeylanica,* (Linn.) Wight.

Eugenia operculata, Roxb., Fl. Ind. ed. 2, **2** (1832) 486.

BRITISH NORTH BORNEO, Mount Kinabalu, Kiau, *Mrs. Clemens 10101,* November, 1915.

India to southern China southward through the Malay Peninsula to Java.

Eugenia cymosa, Lam., Encycl. **3** (1789) 199.

SARAWAK, Mount Merinjak, *Native collector 2602, 2644* (*Bur. Sci.*).

The specimens have somewhat narrower leaves than in the typical form, and are rather prominently but obtusely caudate-acuminate.

India through the Malay Peninsula and Archipelago to the Moluccas.

Eugenia palembanica, (Miq.), comb. nov.

Syzygium palembanicum, Miq., Fl. Ind. Bat. Suppl. (1862) 313.

Eugenia lepidocarpa, Wall., Cat. (1832) no. 3618, *nomen nudum.*

SARAWAK, Retuh, *Native collector 2551* (*Bur. Sci.*), February-June, 1914.

The specimen, which has very young flowers, agrees closely with material from Singapore, but even better with *Van Rossum 5* from Biliton. I have adopted Miquel's specific name as that of Wallich is merely a *nomen nudum;* no description of Wallich's species appears to have been published until 1878.

Burma to Singapore, Sumatra, Billiton and Borneo.

Eugenia densiflora, DC., Prodr. **3** (1828) 287, in syn.

Jambosa densiflora, DC. l.c.

Myrtus densiflora, Blume, Bijär. (1826) 1087.

SARAWAK, Baram District, Mount Skiwa, *Hose 445,* December, 1894.

Malay Peninsula, Sumatra, Borneo and Java.

Eugenia oblata, Roxb., Fl. Ind. ed. 2, **2** (1832) 493.

BRITISH NORTH BORNEO, Mount Kinabalu, trail to Marai Parai Spur, *Mrs. Clemens 10974,* December 1, 1915.

The specimen is in fruit, but agrees in all essentials with Indian material representing Roxburgh's species. Chittagong to the Malay Peninsula and Java (if King's reduction of *Jambosa pulchella,* Miq. is correct).

Eugenia clavata, (Korth.), comb. nov.

Jambosa clavata, Korth. in Nederl. Kruidk. Arch. **1** (1847) 201; Walp. Ann **2** (1851) 638.

Eugenia rhododendrifolia, Miq., in Anal. Bot. Ind. 1 (1850) 19, *t 2.*

SARAWAK, Baram District, Miri River, *Hose 689,* April 21, 1895.

This species is known only from Borneo. *Eugenia rhododendifolia,* Miq., is based on *Jambosa clavata,* Korth., but Korthals's specific name is the valid one for the species.

Eugenia chlorantha, Duthie in Hook. f., Fl. Brit. Ind. **2** (1878) 487.

SARAWAK, Siol, *Native collector 2436* (*Bur. Sci.*), February-June, 1914, flowers pale red.

The specimen agrees with King's amplified description of this species and with authentically named specimens from Penang, except in having slightly smaller flowers and the calyx-tube less thickened than in the typical form. Widely distributed in the Malay Peninsula and also known from Sumatra.

Eugenia ugoensis, C. B. Rob. in Philip. Journ. Sci. **4** (1909) Bot. 389.

BRITISH NORTH BORNEO, Mount Kinabalu, Marai Parai Spur, *Mrs. Clemens 10973,* December 1, 1915, altitude about 2500 meters.

The specimen agrees entirely with Robinson's type except in its slightly more slender branchlets. Otherwise known only from the higher mountains of the northern Luzon.

Eugenia lineata, (Blume), Duthie in Hook. f., Fl. Brit. Ind. **2** (1878) 487.

SARAWAK, *Hewitt,* April, 1906; *Native collector 263, 421, 442, 470, 1692, 2006, 2771* (*Bur. Sci.*); Baram, *Hose 324.*

This species is widely distributed in the Malay Peninsula and Archipelago, extending through Sumatra, Borneo, and Java, apparently to the Moluccas.

Eugenia besukiensis, (Hassk.), comb. nov.

Micro jambosa besukiensis, Hassk. ex Miq., Fl. Ind. Bat. Suppl. (1862) 311 in syn.

Jambosa buxifolia, Miq., Fl. Ind. Bat. **1**^{1} (1858) 1086, non *Eugenia buxifolia,* Willd.

SARAWAK, Siol, *Sarawak Museum 70,* with the local name *ubah beti;* BRITISH NORTH BORNEO, Sandakan, *Villamil 114,* 1916, rocky places near the seashore, *Mrs. Clemens 9509,* December 21, 1915, on banks near the beach.

This very characteristic species was originally described by Miquel from specimens collected in Bangka, but Miquel's specific name is untenable in *Eugenia.*

Eugenia zeylanica, (Linn.) Wight, Ic. 1 (1840) 73.

Syzygium zeylanicum, DC., Prodr. 3 (1828) 260.
Eugenia varians, Miq., in Anal. Bot. Ind. 1 (1850) 21, excl. syn. *Syzygium rugosum*, Korth.

SARAWAK, *Native collector 262, 476, 1117, 1453, 1854* (*Bur. Sci.*).

The specimens agree closely with material from the Malay Peninsula and India as well as with the descriptions of the above species.

India and Ceylon through the Malay Peninsula to Sumatra, Borneo, and Java.

Tristania, R. Brown.

Tristania anomala, sp. nov.

Arbor glabra, inflorescentiis parce adpresse pubescentibus exceptis; *ramis* teretibus, ramulis distincte trigonis; *foliis* alternis, coriaceis, usque ad 2.5 cm. longis, oblongo-obovatis, obtusis, basi cuneatis, nitidis, costa supra impressa, subtus prominente, nervis lateralibus circiter 10, obscuris, interdum subobsoletis vel obsoletis; *inflorescentiis* terminalibus axillaribusque, pedunculatis, 2 ad 4 cm. longis, partibus junioribus parce pubescentibus; *floribus* 5-meris, urceolatis, 2 mm. longis; petalis 5, suborbicularis, 0.8 mm. diametro; *staminibus* 5, oppositipetalis.

A tree, glabrous except the younger parts of the inflorescence. Branches terete, grayish-brown, the bark somewhat wrinkled, the branchlets triangular, reddish-brown. Leaves alternate, coriaceous, oblong-obovate, obtuse, narrowed to the cuneate base, margin slightly recurved, 1.7 to 2.5 cm. long, 8 to 14 mm. wide, the upper surface minutely pitted, pale-olivaceous or brownish when dry, shining, the midrib impressed on the upper surface, rather prominent beneath; lateral nerves about 10 on each side of the midrib, slender, obscure, sometimes obsolete or nearly so, anastomosing with the equally obscure marginal nerves; petioles about 2 mm. long. Cymes terminal and in the upper axils, peduncled, 2 to 4 cm. long, 2 cm. wide or less, the younger parts sparingly appressed-pubescent. Flowers urceolate, 2 mm. long and wide, pedicelled, sparingly appressed-pubescent externally, yellowish. Calyx teeth 5, triangular, acute, 0.3 mm. long. Petals 5, suborbicular, about 0.8 mm. in diameter. Stamens one opposite each petal; filaments glabrous, 0.4 mm. long. Fruit unknown.

SARAWAK, summit of Mount Murud, *Native collector 2868* (*Bur. Sci.*) (*Original number 122*), December 1, 1914.

This species, like the next, is anomalous in *Tristania* by having but a single stamen opposite each petal, and this character alone might be deemed sufficiently important to warrant describing the present species as a new generic type. However, as the fruits are unknown, and as in all other characters the plant corresponds with *Tristania,* I have so described it. In some species of *Tristania* the reduction of the number of stamens is very marked; I have a specimen of *T. sumatrana,* Miquel, from Billiton in which there are but two or three stamens opposite each petal, while in the Philippine *T. decorticata* there are but three stamens opposite each petal, so that it is not surprising to find a plant that is a *Tristania* in all respects, except its stamens, in which the reduction in the number of stamens has gone to the extreme of one stamen for each petal.

Tristania pentandra, sp. nov.

Frutex 2 ad 3 m. altus novellis inflorescentiisque exceptis glaber; *foliis* alternis, oblongis ad oblanceolatis, coriaceis, in siccitate brunneis, nitidis, usque ad 9 cm. longis, utrinque subaequaliter angustatis acuminatisque, haud puncticulatis, nervis utrinque circiter 18, adscendentibus, tenuibus, obscuris; *inflorescentiis* axillaribus, pubescentibus, pedunculatis, circiter 2.5 cm. longis; *floribus* 5-meris, 2 mm. longis, *staminibus* 5; *ovario* 3-loculare.

A shrub 2 to 3 m. high, the younger branchlets and inflorescences brown-pubescent, the very young leaves sparingly pubescent, otherwise glabrous. Branches terete, dark-brown, the branchlets nearly black when dry, irregularly angled or subterete. Leaves crowded, alternate, oblong to oblanceolate, brown and somewhat shining when dry, not glandular-puncticulate, 6 to 9 cm. long, 1.5 to 2.5 cm. wide, subequally narrowed and acuminate at both ends, the apex blunt-acuminate; midrib impressed on the upper surface, prominent beneath, the lateral nerves slender, obscure, ascending, about 18 on each side of the midrib, anastomosing with the slender submarginal veins about 1 mm. from the edge of the leaf. Cymes in the uppermost axils, peduncled, brown-pubescent, about 2.5 cm. long, 1 to 1.5 cm. wide, the flowers rather numerous, crowded, 5-merous, their pedicels 1.5 to 2 mm. long. Calyx pubescent, 2 mm. long and wide, subturbinate or turbinate-urceolate, the teeth triangular, acute, 0.5 mm. long. Petals 5, orbicular-obovate, glabrous, 1 mm. long, rounded. Stamens one opposite each petal, their filaments glabrous, 0.8 mm. long. Ovary pubescent, 3-celled.

SARAWAK, Mount Poe, *Foxworthy 378,* June 3, 1908, near the summit, altitude about 1700 meters, the flowers yellow, fragrant. Known to the Dyaks as *bindang.*

This species strongly resembles the Philippine *Tristania decorticata*, Merr., and has been so reported by Robinson.* However, it is at once distinguishable from the Philippine species by its solitary stamens opposite each petal, a character unknown in the genus *Tristania* except in the present species and in *T. anomala*, Merr. It is readily distinguished from the latter by its much larger, differently shaped leaves.

Tristania clementis, sp. nov.

Arbor parva, glabra ramulis junioribus exceptis inflorescentiisque minute adpresseque cupreo-pubescentibus; *foliis* subcoriaceis, oblongo-obovatis, nitidis, usque ad 7.5 cm. longis, obtusis ad late obtuseque acuminatis, basi cuneatis, margine leviter recurvatis, subtus distincte puncticulatis, nervis primariis utrinque circiter 15 tenuibus; *inflorescentiis* axillaribus, pedunculatis, circiter 3 cm. longis, dichotomis; *floribus* 5-meris, circiter 3 mm. diametro, petalis glabris, orbiculari-obovatis, minute crenulatis; *staminibus* 25 vel 30 in phalangibus 5- vel 6-andris dispositis; ovario pubescente, 3-loculare.

A small tree, glabrous except the minutely appressed-cupreous-pubescent branchlets and inflorescences. Branches terete, dark reddish-brown or nearly black when dry, the branchlets more or less compressed-angular, reddish-brown. Leaves subcoriaceous, oblong-obovate, 5 to 7.5 cm. long, 1.5 to 3 cm. wide, the upper surface greenish-olivaceous and shining when dry, minutely and obscurely puncticulate, the lower surface pale-brownish, distinctly glandular-punctate, apex obtuse to broadly and shortly blunt-acuminate, base cuneate, margins somewhat recurved; lateral nerves about 15 on each side of the midrib, slender, not prominent, obscurely anastomosing with the marginal nerves about 1 mm. from the edge of the leaf; petioles brown, 5 to 9 mm. long. Cymes in the upper axils, about 3 cm. long, peduncled, dichotomous, minutely appressed-pubescent with cupreous hairs, rather few-flowered. Flowers 5-merous, about 3 mm. long and wide, their pedicels 1.5 to 2 mm. long, somewhat crowded on the ultimate branchlets. Calyx turbinate, slightly pubescent, the teeth 5, very broad, shallow, subacute. Petals glabrous, dull white, orbicular-obovate, rounded, minutely crenulate, 1.2 mm. long. Stamens in five phalanges opposite the petals, 5 or 6 in each group, the filaments 0.5 to 1 mm. long, united and sparingly pubescent below. Ovary sparingly pubescent, 3-celled; style glabrous, 1 mm. long.

British North Borneo, Jesselton, *Mrs. Clemens 9570*, October 23, 1915, on hillsides near dwellings, cultivated, the bark shedding like that of *Eucalyptus*.

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* Philip. Journ. Sci. 4 (1909) Bot. 324.

This species differs from *Tristania obovata,* R. Br., in its smaller, narrower, differently shaped, not retuse leaves, in its sparingly pubescent, not glabrous calyces, its more numerous stamens, and its minutely crenulate, not sharply toothed petals. From *T. merguensis,* Griff., it differs in its much smaller flowers and in numerous other characters.

Tetraeugenia, genus novum.

(*Myrtoideae-Myrteae-Eugeniinae*).

Calycis tubus oblongo-obovoideus, deorsum angustatus, supra ovarium leviter productus; limbi segmenta 4, minuta. *Petala* conniventia et in calyptram connata. *Stamina* 4, libra, filamentis brevissimis, calycis limbum haud superantia; antherae parvae, loculis longitudinaliter dehiscentes. *Ovarium* 2-loculare. *Arbor* (vel frutex) glabra. *Folia* opposita, glanduloso-punctata, penninervia, nervis distantibus, prominentibus, arcuato-anastomosantibus. *Flores* minimi axillares terminalesque, fasciculati vel in cymis depauperatis dispositi.

Tetraeugenia caudata, sp. nov.

Arbor (vel frutex) glabra, **ramis ramulisque tenuibus,** teretibus: *foliis* papyraceis, ovato-ellipticis, in siccitate olivaceis, nitidis, usque ad 11 cm. longis, pellucido-punctatis, basi acutis, apice longe tenuiterque caudato-acuminatis, nervis utrinque 8 ad 10 subtus prominentibus distantibus arcuato-anastomosantibus; *floribus* paucis, minutis, axillaribus terminalibusque, oblongo-obovoideis, 2.3 ad 3 mm. longis, fasciculatis vel in cymis valde depauperatis dispositis: *calyce* minute 4-denticulato.

A glabrous tree or shrub, the branches and branchlets slender, terete, 1 to 1.5 mm. in diameter, the former pale, the latter brown and sometimes slightly flattened at the nodes. Leaves opposite, chartaceous, olivaceous, somewhat shining and of about the same color on both surfaces when dry, ovate-elliptic, 7 to 11 cm. long, 3 to 4.5 cm. wide, base acute or somewhat acuminate, apex slenderly caudate-acuminate, the acumen 1.5 to 2.5 cm. long, blunt, minutely pellucid-punctate, the glands evident on the upper surface, obsolete on the lower surface; lateral nerves 8 to 10 on each side of the midrib, prominent on the lower surface, straight, anastomosing with the somewhat arched and equally prominent marginal nerves 3 to 7 mm. from the edge of the leaf; petioles 1 cm. long or less. Flowers axillary and terminal, few, fascicled or in very depauperate cymes, oblong-obovoid, 2.5 to 3 mm. long, buds rounded, tapering below, the subtending bracteoles ovate-lanceolate, acuminate, about 1 mm. long. Calyx-teeth 4, minute.

Petals united into a deciduous calyptra about 1 mm. in diameter. Stamens 4, not exceeding the calyx-rim in length.

SARAWAK, Baram District, Mount Trekan, *Hose 6*, July, 1895, altitude about 600 meters.

On first studying the above specimen I was disposed to place it in the genus *Aphanomyrtus*, but it differs so radically from all the described species of this genus and of its synonym *Pseudoeugenia*, that it manifestly is worthy of consideration as a distinct generic type. Distinguishing characters are its laxly veined leaves, its four stamens, and its petals being united into a distinct calyptra as in *Syzygium*. It apparently holds about the same relationship to *Syzygium* as *Aphanomyrtus* does to *Jambosa*.

LOGANIACEAE.

Fagraea, Thunberg.

This genus is apparently well developed in Borneo, for a number of species have been described already from the comparatively small Bornean collections available to botanists in the past sixty-five years. The following species have been described from Bornean material: *Fagraea borneensis*, Scheff., *F. coarctata*, Blume (= *F. racemosa*, Jack, fide King), *F. cordifolia*, Blume, *F. crassipes*, Benth (= *F. cuspidata*, Blume, fide Boerlage), *F. cuspidata*, Blume. *F. heterophylla*, Blume, *F. ligustrina*, Blume, *F. macroscypha*, Baker, *F. minor*, Blume, *F. robusta*, Blume (= *F. racemosa*, Jack, fide King), *F. spicata*, Baker, and *F. splendens*, Blume (= *F. rostrata*, Blume, fide Miquel) ; also there is *F. stenophylla*, Becc., named, but as yet undescribed. In addition to these a few other species have been credited to Borneo by various authors, including *Fagraea racemosa*, Jack, (*F. morindaefolia*, Blume), and *F. litoralis*, Blume, var. *forstenii*, Miq. From a study of our own Bornean collections, however, it is evident that many forms of this characteristic genus still remain to be described, for these comparatively small collections present no less than fourteen distinct species of the genus. A number of these I have been able to determine as species previously described by other authors, but five are apparently worthy of description as new species.

Fagraea grandifolia, sp. nov.

Species *F. racemosae* affinis, differt foliis majoribus, nervis magis numerosis, utrinque 10 ad 12; *foliis* ellipticis ad oblongo-ellipticis, coriaceis, pallide brunneis, usque ad 35 cm. longis, apice abrupte brevissime et obtuse acuminatis, basi subrotundatis; *inflorescentiis* 20 ad 30 cm. longis, longe pedunculatis, cymis oppositis, distantibus, paucifloris, inferioribus pedunculatis, superioribus sessilibus; *floribus* circiter 2.5 cm. longis, longe pedicellatis.

Branches and branchlets terete, brown, the ultimate ones about 5 mm. in diameter. Leaves coriaceous, pale-brownish on both surfaces when dry, slightly shining, 27 to 35 cm. long, 14 to 17 cm. wide, apex abruptly and shortly obtuse-acuminate, the acumen about 5 mm. long, the base somewhat rounded, elliptic to oblong-elliptic; lateral nerves 10 to 12 on each side of the midrib, prominent on the lower surface, curved, the reticulations obsolete or very lax and indistinct on the upper surface; petioles about 2 cm. long. Inflorescences terminal, including the peduncles 20 to 30 cm. long, the peduncles about as long as the flower-bearing parts, the flowers in distant opposite cymes, the lower cymes peduncled and about 5 cm. long, the upper sessile, all few-flowered. Flowers 5-merous, about 2.5 cm. long, their pedicels 5 to 13 mm. long. Calyx cup-shaped, about 6 mm. long, the lobes broad, rounded. Corolla-tube about 2.2 cm. long, gradually widened upward, the lobes elliptic, rounded, spreading, about 7 mm. long.

SARAWAK, Baram District, Miri River, *Hose 742,* April 20, 1895.

The alliance of this species is manifestly with *Fagraea racemosa,* Jack, from which it is readily distinguished by its larger more numerously nerved leaves, long peduncled, lax inflorescences, the opposite cymes rather widely separated, the lower ones peduncled and the upper ones sessile, few-flowered, the flowers rather long-pedicelled.

Fagraea acuminatissima, sp. nov.

Species *F. obovatae* affinis, ramis ramulisque brunneis, teretibus; *foliis* coriaceis, oblongo-ellipticis, usque ad 20 cm. longis, eveniis, basi acutis, apice tenuiter acute caudato-acuminatis, opacis, in siccitate brunneis vel supra subolivaceis; petiolo 2.5 ad 5 cm. longo; *inflorescentiis* terminalibus, sessilibus vel brevissime pedunculatis, umbellatim 3- ad 5-floris; *floribus* sessilibus, circiter 5 cm. longis; *calycis* lobis ovatis, obtusis, circiter 6 mm. longis; *corollae* tubo circiter 3 cm. longo, sursum ampliato, lobis patulis, oblongis, obtusis, circiter 1.5 cm. longis.

Apparently scandent, entirely glabrous, the branches and branchlets terete, dark-brown, the ultimate ones 4 to 5 mm. in diameter, smooth. Leaves thickly coriaceous, oblong-elliptic, 14 to 20 cm. long, 4.5 to 6 cm. wide, base acute, apex rather abruptly and slenderly caudate-acuminate, the acumen acute, about 2 cm. long, the upper surface brown or somewhat olivaceous, dull, the lower brown, both surfaces minutely verruculose when dry, the midrib very prominent on the lower surface, the nerves and reticulations obsolete; petioles 2.5 to 5 cm. long; stipules broadly triangular-ovate, about 4 mm. long.

Flowers terminal, about 5 cm. long, 5-merous, subumbellately arranged, sessile, 3 to 5 at the apex of each branchlet, the inflorescence sessile or very shortly peduncled, the bracts coriaceous, acuminate, ovate-lanceolate, 4 to 5 mm. long, the two bracteoles subtending each flower similar but much smaller. Calyx 10 to 11 mm. long, the lobes ovate, obtuse, 6 mm. long. Corolla-tube about 3 cm. long, slender below, gradually widened in the upper one-half and about 7 mm. in diameter at the throat; lobes spreading, oblong, obtuse, about 1.5 cm. long; anthers somewhat exserted, about 2 mm. long.

SARAWAK, Matang road, *Native collector 686* (*Bur. Sci.*), June 29, 1911, with the local name *nyatu*. Perhaps referable here is *Hose 46* from the Baram District, April, 1895, of which I have a very fragmentary specimen. In this specimen the leaves are relatively wider, about 14 cm. long and 7 cm. wide, while the flower is slightly longer than in the type, the corolla being 5.5 cm. in length.

The alliance of this species is manifestly with *Fagraea obovata,* Wall., from which it is distinguished by its differently shaped, slenderly and acutely caudate-acuminate leaves. By the latter character it is also distinguished from the Bornean species, *Fagraea heterophylla,* Blume, *F. rostrata,* Blume, and *F. splendens,* Blume.

Fagraea involucrata, sp. nov.

Glabra, ramis ramulisque teretibus; *foliis* oblongis ad oblongo-ellipticis, crasse coriaceis, usque ad 22 cm. longis, in siccitate supra atro-brunneis, subtus brunneis, opacis, apice abrupte et tenuiter acute acuminatis, basi acutis vel decurrento-acuminatis, nervis utrinque circiter 10, supra obscuris, subtus prominentibus; stipulis subreniformibus, coriaceis, reflexis, circiter 1.5 cm. latis; *floribus* terminalibus, solitariis, sessilibus, circiter 20 cm. longis, bracteolis 4 elliptico-ovatis acutis vel acuminatis crasse coriaceis circiter 4 cm. longis calycem involucrantibus; *calycis* tubo vix 1 cm. longo, lobis oblongo-ovatis, acuminatis, coriaceis, 6 cm. longis; *corolla* alba, tubo 15 cm. longo, sursum ampliato, lobis patulis vel reflexis, ovatis, 3.5 ad 4 cm. longis; *antheris* exsertis, 1 cm. longis.

Glabrous, the branches and branchlets terete, dark-colored when dry, the ultimate ones 6 to 8 mm. in diameter, smooth. Leaves thickly coriaceous, minutely verruculose on both surfaces when dry, dull, oblong to oblong-elliptic, 14 to 22 cm. long, 5 to 8 cm. wide, the upper surface blackish-brown when dry, the lower brown, apex rather abruptly and slenderly acute-acuminate, the acumen about 1 cm. long, base acute to somewhat decurrent-acuminate, the midrib prominent on both surfaces; lateral nerves about 10 on each side of the midrib, very obscure on the upper surface, very prominent on the lower surface, dark-brown in contrast to the paler epidermis, spreading, slightly curved, scarcely anastomosing, the reticulations obsolete; peticles 1.5 to 2.5 cm. long; stipules subreniform, coriaceous, reflexed, persistent, about 1.5 cm. wide and 1 cm. long. Flowers terminal, sessile, solitary, white, the calyx subtended and enclosed by an involucre of four, thickly coriaceous, brown (when dry), acute to acuminate bracteoles about 4 cm. long and 2 to 2.5 cm. wide which closely invest the calyx. Calyx 7 cm. long, the tube broad, scarcely 1 cm. in length, the lobes brown when dry, thickly coriaceous, oblong-ovate, acuminate, 6 cm. long, 2.5 to 3 cm. wide, imbricate. Corolla-tube thickly coriaceous, 15 cm. long, dark-brown when dry, when somewhat flattened 8 mm. wide at the base and 3 cm. wide at the apex, the lobes 5, spreading or recurved, coriaceous, ovate, rounded, 3.5 to 4 cm. long. Anthers somewhat exserted, oblong-ellipsoid, 1 cm. long.

SARAWAK, Mount Sudan, *Native collector 2083* (*Bur. Sci.*) February-June, 1914.

This remarkable species is manifestly allied to *Fagraea macroscypha*, Baker, and in fact I first referred it to Baker's species. It differs in its distinctly acuminate, not acute, larger leaves, larger calyx, and corolla, and perhaps in other characters. Baker's description is imperfect in some respects, and he does not indicate the number of bracteoles in his species.

Fagraea cymosa, sp. nov.

Arbor parva, glabra, ramis ramulisque teretibus, glauco-pruinosis, vel ramulis junioribus brunneis et leviter compressis; *foliis* late ovatis, vel elliptico-ovatis, crasse coriaceis, usque ad 23 cm. longis, in siccitate brunneis, apice abrupte acuminatis, basi late truncato-rotundatis, nervis utrinque 6 ad 8, prominentibus; *inflorescentiis* terminalibus, cymosis, diffusis, usque ad 11 cm. longis, breviter pedunculatis, dichotomis; *floribus* 2 vel 3 in ramulis ultimis dispositis, longe pedicellatis, circiter 5.5 cm. longis. Species *F. racemosae*, Jack, affinis.

A small glabrous tree, the branches and branchlets terete, glaucous-pruinose, or the younger branchlets brown and somewhat compressed, the ultimate ones 3 to 5 mm. in diameter. Leaves brown when dry, thickly coriaceous, slightly shining, broadly ovate to elliptic-ovate, 17 to 23 cm. long, 11 to 15 cm. wide, apex abruptly acuminate, base broadly rounded-truncate; lateral nerves 6 to 8 on each side of the midrib, prominent, anastomosing, the reticulations lax, indistinct; petioles brown or pruinose, about 1 cm. long. Cymes terminal, diffuse, dichotomous, up to 11 cm. in length, the peduncles 1.5 to 3.5 cm. long, the ultimate branches of the cymes bearing 2 or 3, long-pedicelled, white, 5-merous flowers, the bracteoles broad, rounded, coriaceous, 2 to 3 mm. long, the pedicels 1.5 to 2.5 cm. long. Calyx about 1 cm. long, brown when dry, base cuneate, the lobes broadly-ovate to suborbicular, rounded, about 5 mm. long. Corolla 5 cm. long, narrowed below, the lobes broadly ovate, rounded, about 1 cm. long; anthers slightly exserted, about 6 mm. long.

BRITISH NORTH BORNEO, Jesselton, *Mrs. Clemens 9627,* December 14, 1915, on hills near the seashore; "also seen at Kiau." I am disposed to refer here also the following specimens from Sarawak: *Native collctor 383, 776* (*Bur. Sci.*), May, 1911, with the native name *sukung.* These two specimens differ from the type in having somewhat smaller flowers, the corolla about 3.5 cm. in length, but in other characters closely approximate it.

The alliance of this species is manifestly with *Fagraea racemosa,* Jack, from which it is distinguished by its much shorter, cymose, rather diffuse inflorescences and long-pedicelled flowers. It differs from the other Bornean species in this group, namely *Fagraea coarctata,* Blume, *F. crassipes,* Benth., *F. cuspidata,* Blume, and *F. robusta,* Blume, in its shortly peduncled inflorescences which are cymose, not racemose in arrangement.

Fagraea uniflora, sp. nov.

Frutex scandens, ramis ramulisque teretibus; *foliis* oblongis, coriaceis, in siccitate atro-brunneis, usque ad 14 cm. longis, basi acutis, apice tenuiter acute acuminatis, nervis utrinque circiter 7, tenuibus, valde obscuris vel subobsoletis; *floribus* solitariis, terminalibus, pallide luteis, breviter pedicellatis, bibracteolatis, circiter 13 cm. longis; *calyce* 3 cm. longo, lobis 6 ovato-ellipticis, circiter 1 cm. longis, coriaceis; *corollae* tubo 8 ad 9 cm. longo, lobis 8 vel 9 oblongis vel leviter oblongo-obovatis, obtusis, coriaceis, circiter 4 cm. longis.

A scandent shrub, apparently epiphytic, glabrous. Branches and branchlets terete, nearly black when dry, the ultimate ones about 4 mm. in diameter. Leaves coriaceous, oblong, 12 to 14 cm. long, 3.8 to 5 cm. wide, the apex rather slenderly acute-acuminate, base acute, margins slightly recurved, the upper surface blackish-brown when dry, slightly shining, the lower paler, both minutely verruculose, the midrib prominent on both surfaces; lateral nerves about 7 on each side of the midrib, very slender, obscure, sometimes obsolete or nearly so; petioles 1.5 to 2 cm. long, black when dry, base somewhat dilated and clasping the stem. Flower pale-yellow, fragrant, when dry dark-brown, terminal, solitary, the pedicel stout, nearly 1 cm. long, bibracteolate, the bracteoles coriaceous, very broad, rounded, about 3 mm. long. Calyx 5 cm. long, the lobes 6, ovate-elliptic, obtuse, coriaceous, about 1 cm. long. Corolla-tube 8 to 9 cm. long, 5 to 6 mm. in diameter below, somewhat widened upward, the lobes 8 or 9, oblong or somewhat oblong-obovate, coriaceous, obtuse, about 4 cm. long, 1 to 1.3 cm. wide. Anthers linear lanceolate, 1 cm. long, slightly exserted.

SARAWAK, Santubong, *Foxworthy 114,* May 15, 1908, known to the Dyaks as *numpang.*

A very characteristic species on account of its large, solitary, terminal, shortly pedicelled flowers, its six calyx-lobes, and 8 or 9 corolla lobes, these floral characters being anomalous in the genus. It is perhaps as closely allied to *Fagraea monantha,* Miq., as to any other species, but does not conform to Miquel's imperfect description in its terete branches, longer petioles, pedicelled flowers, and 6-merous calyx. Miquel does not describe the corolla of his species.

Fagraea stenophylla, Becc., Nelle Foreste di Borneo (1902) 524, *fig. 65, 1* (opp. p. 402), *nomen nudum.*

Glabra, ramis ramulisque teretibus, circiter 5 mm. diametro, ramulis in siccitate pallidis; *foliis* anguste lanceolatis, coriaceis, circiter 25 cm. longis et 2 cm. latis, tenuiter acuminatis, basi cuneatis, nervis utrinque circiter 12, obscuris vel interdum obsoletis; *inflorescentiis* terminalibus, racemosis, pedunculatis, paucifloris; *floribus* 5-meris, ad nodos inferiores 3—2, ad superiores 1. Species *F. racemosae* similis.

Fagara stenophylla, Becc., as originally used, is a *nomen nudum,* it being unaccompanied by any word of description, but merely by the citation of *Beccari 3863,* as representing it. The figure cited is a photographic reproduction of a single leaf, from which the species is determinable in connection with other Bornean material representing it. The species is manifestly in the group with *Fagraea racemosa,* Jack, and is well characterized by its very narrow leaves. The short description given above is based on *Native collector 2828* (*Bur. Sci.*) from Selungo, Upper Baram, Sarawak, November 26, 1914.

Fagraea fragrans, Roxb., Fl. Ind. ed. 2, **1** (1832) 461.

SARAWAK, *Native collector 685* (*Bur. Sci.*), July, 1911, with the native name *tibuan:* BRITISH NORTH BORNEO, Jesselton, *Mrs. Clemens 9563,* October, 1915, on hillsides, abundant.

Malay Peninsula and Sumatra, Java, (cultivated), through Borneo to Palawan, the Calamianes Islands, and Mindoro in the Philippines.

Fagraea speciosa, Blume, Rumphia **2** (1836) 35, *t. 81.*

Cyrtophyllum speciosum, Blume, Bijdr. (1826) 1022.

BRITISH NORTH BORNEO, Sandakan, *Villamil 202, 251 bis,* January and November, 1916, with flowers and fruits.

The specimens here referred to Blume's species differ from the typical form in some slight characters, but I believe belong here. Java to the Moluccas.

Fagraea spicata, Baker in Kew Bull. (1896) 25.

BRITISH NORTH BORNEO, Sandakan, *Villamil 293,* January, 1917, in brush-land at low altitudes; *Mrs. Clemens 9453,* October, 1915, with narrower leaves than the typical form.

This endemic species, allied to *Fagraea racemosa,* Jack, is well characterized by its condensed spicate inflorescences.

Fagraea cuspidata, Blume, Mus. Bot. **1** (1850) 170.

SARAWAK, *Native collector 1669, 1812, 1940, 2787 (Bur. Sci.)*; BRITISH NORTH BORNEO, Tenom, *Villamil, 331,* April 8, 1917.

The type of *Fagraea cuspidata,* Blume, was from Borneo, while that of *F. crassipes,* Benth., was from Labuan. Boerlage has reduced Bentham's species to Blume's as a synonym, and after an attentive comparison of the descriptions with each other and with the Bornean specimens cited above, I consider that he is correct. Boerlage also places *Fagraea robusta,* Blume, here, and, with doubt, *F. appendiculata,* Blume. King, however, has referred the first to *F. racemosa,* Jack. Typical *Fagraea racemosa,* Jack, is not represented in our Bornean collections, although it unquestionably occurs in the Island.

APOCYNACEAE.

Alyxia, Banks.

Alyxia pachyphylla, sp. nov.

Frutex scandens, ramulis et foliis junioribus et inflorescentiis plus minusve pubescentibus; *ramis* teretibus, glabris vel subglabris, ramulis distincte 4-angulatis, scabridis, leviter pubescentibus; *foliis* 4-natis, crasse coriaceis, ellipticis ad oblongo-ellipticis, usque ad 4.5 cm. longis, apice rotundatis, basi acutis vel subacutis, subolivaceis, nitidis, margine valde recurvatis, nervis utrinque circiter 15 supra obscuris subtus obsoletis; *cymis* axillaribus, pedunculatis, paucifloris, 1 ad 2 cm. longis; *floribus* circiter 8 mm. longis; *corolla* extus glabra; *ovario* dense pubescente.

A scandent shrub, the younger parts and inflorescences more or less pubescent. Branches terete, reddish-brown. smooth or scabrid, about 3 mm. in diameter, the branchlets prominently 4-angled, scabrid and pubescent with short spreading hairs, the internodes 2 to 7 cm. long. Leaves in whorls of fours, elliptic to oblong-elliptic, very thickly coriaceous, 3 to 4.5 cm. long. 1.2 to 2 cm. wide, apex rounded, base acute or subacute, the margins very strongly recurved, the very young ones pubescent on both surfaces with scattered, short spreading hairs. the older ones entirely glabrous, upper surface olivaceous. shining, the lower paler, the midrib here very prominent, the nerves and reticulations obsolete, the upper surface with about 15 pairs of faint nerves spreading at an angle of 90°, slightly impressed; petioles 3 to 5 mm. long. Cymes axillary, peduncled, few-flowered, cinereous-pubescent, their peduncles 5 to 10 mm. long. Flowers white, 3 to 5 on each peduncle, the bracts oblong-ovate to ovate, subobtuse, 1.5 mm. long, the bracteoles similar, smaller, sparingly pubescent. Calyx 2 mm. long, the lobes 5, ovate, obtuse, pubescent, 1 mm. long. Corolla-tube about 6 mm. long, glabrous externally, pubescent within, the lobes broadly ovate, spreading, obtuse, 2 mm. long. Anthers 1 mm. long. Ovary densely pubescent; style glabrous, 3 mm. long.

SARAWAK, Mount Santubong, *Native collector 2224* (*Bur. Sci.*), February-June, 1914.

A very strongly characterized species apparently most closely allied to *Alyxia oleifolia,* King & Gamble, of the Malay Peninsula, differing, however, in its smaller leaves which are rounded at the apex, pubescent cymes, broad calyx lobes, and other characters.

Alyxia odorata, Wall., Cat. (1829) No. 1606; King & Gamble in Journ. As. Soc. Beng. **74**^{2} (1907) 418.

SARAWAK, Matang Road, *Native collector 857* (*Bur. Sci.*), August 11, 1911, with the native name *patuk manuk.*

The identification has been made from the description given by King and Gamble; the Bornean specimen, cited above, differs in having the leaves distinctly acuminate. Tenasserim to Malacca and Singapore.

RUBIACEAE.

Timonius, de Candolle.

In 1909 Dr. Th. Valeton* published a consideration of the Malayan species of *Timonius* in which he recognized thirty-three

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*Valeton, Th. Beitrage zur Kenntniss der Gattung Timonius. *Bull. Dépt. Agr. Ind. Neerl.* **26** (1909) 1-61.

species, of which nine were credited to Borneo. In our own collections of Bornean plants no less than thirteen distinct species are represented, some of the specimens manifestly pertaining to forms described by Valeton, others representing characteristic and strongly marked species that I cannot refer to any known forms of the genus. In 1909 but about six species of the genus were known from the Philippines, but the Philippine list to-day approximates twenty distinct forms, and current collections indicate that the list will be considerably increased as botanical exploration of the Archipelago progresses. It is not surprising, then, that a number of undescribed forms should be found in our comparatively small collections of Bornean plants, and it is confidently expected that a continued botanical exploration of Borneo will yield many other species of this characteristic genus.

Timonius hosei, sp. nov.

Arbor, ramulis et inflorescentiis et foliis pubescentibus; *foliis* oppositis, oblanceolatis ad oblongo oblanceolatis, petiolatis, usque ad 20 cm. longis, chartaceis ad subcoriaceis, apice breviter acute acuminatis, basi gradatim angustatis, cuneatis, in siccitate pallidis, utrinque praesertim ad costam nervosque breviter pubescentibus; nervis utrinque 14 ad 16, prominentibus, venis subparallelis; stipulis ovato-lanceolatis, circiter 1.8 cm. longis, acuminatis, extus pubescentibus, intus dense pallide adpresse-hirsutis; *inflorescentiis* ♂ axillaribus, confertis, brevissime pedunculatis, plerumque trichotomis; *floribus* 5-meris circiter 1.5 mm. longis.

A tree, the branches terete, pale, glabrous, the branchlets rather densely ferruginous-pubescent with short hairs. Leaves opposite, chartaceous to subcoriaceous, oblanceolate to oblong-oblanceolate, 16 to 20 cm. long, 5 to 8 cm. wide, the apex shortly and acutely acuminate, gradually narrowed in the lower one-half or two-thirds to the cuneate base, pale when dry, slightly shining, of about the same color on both surfaces, the upper surface densely brown-pubescent on the midrib and lateral nerves with short hairs and with scattered ones on the epidermis, the lower surface rather uniformly pubescent on the midrib, nerves, and reticulations with similar but pale-brownish hairs; lateral nerves 14 to 16 on each side of the midrib, prominent, slightly curved, anastomosing, the primary reticulations distinct on the lower surface, parallel or subparallel; petioles densely pubescent, 1 to 1.4 cm. long; stipules ovate-lanceolate, acuminate, about 1.8 cm. long, externally pubescent, internally densely appressed-hirsute with pale hairs. Staminate inflorescences axillary, dense, including the flowers 3 cm. long or less, rather uniformly and densely pubescent with pale yellowish-brown hairs, sessile or very shortly peduncled, usually trichotomous, the branches dichotomous or trichotomous; bracts broadly ovate, acuminate, pubescent, 5 to 6 mm. long, the bracteoles similar but smaller. Flowers 5-merous, densely crowded, sessile or shortly pedicelled, often in groups of threes. Calyx cylindric, 6 to 8 mm. long, about 4 mm. in diameter, densely pubescent externally, glabrous within, the teeth 5, ovate, acuminate, less than 1 mm. long. Corolla-tube about 12 mm. long, densely pubescent, the lobes 5, oblong, obtuse, 6 mm. long and 3 mm. wide. Anthers linear, 4 mm. long.

SARAWAK, Baram District, Miri, *Hose 660,* April, 1895.

The distinct primary reticulations of the leaves are parallel or nearly so, but the species does not otherwise appear to be closely allied to any of those separated by Valeton under this character. It is well distinguished by its vegetative characters, its indumentum, and its dense inflorescences.

Timonius villamilii, sp. nov.

Arbor 5 ad 9 m. alta, inflorescentiis ferrugineo-pubescentibus exceptis glabra vel subglabra; *foliis* oblongo-obovatis, usque ad 22 cm. longis, in siccitate brunneis vel olivaceo-brunneis, nitidis, apice brevissime acute acuminatis, in dimidio inferiore gradatim angustatis, basi acutis vel subobtusis, sessilibus vel brevissime petiolatis, nervis utrinque circiter 10 prominentibus, venis laxe reticulatis; *floribus* ♀ axillaribus, solitariis, breviter pedicellatis, circiter 2 cm. longis, 6-meris; *fructibus* ovoideis vel ellipsoideis, circiter 2 cm. longis, plus minusve pubescentibus, pyrenis numerosis, omnibus verticalibus.

A tree 5 to 9 m. high, nearly glabrous except the distinctly ferruginous-pubescent inflorescences and fruits. Branches brownish, the ultimate ones about 5 mm. in diameter, the stipular-scars ferruginous-pubescent. Leaves crowded toward the apices of the branchlets, oblong-obovate, 18 to 22 cm. long, 8 to 10 cm. wide, sessile or subsessile, brownish or brownish-olivaceous when dry, the upper surface shining, the lower paler the younger ones very sparingly pubescent along the midrib, chartaceous to subcoriaceous, the apex very shortly and acutely acuminate or merely acute, narrowed in the lower one-half to the acute or subobtuse base, the basal part 5 mm. wide or less; lateral nerves about 10 on each side of the midrib, prominent, ascending, slightly curved and obscurely anastomosing, the reticulations rather lax, netted, not very prominent; stipules lanceolate, slightly pubescent, acuminate, about 1.5 cm. long. Pistillate flowers axillary, solitary, 6-merous, about 2 mm. long, the pedicels solitary, stout, pubescent, about 5 mm. long, in fruit up to 1 cm. in length. Calyx ovoid or ellipsoid, terete, externally densely ferruginous-pubescent with appressed hairs, the tube produced 4 mm., obscurely and broadly 6-toothed. cylindric. Corolla-tube 10 mm. long, externally densely appressed pale-pubescent, the lobes 6, oblong, subobtuse. 7 mm. long, somewhat spreading in anthesis, very much thickened and keeled inside. Anthers 3 mm. long. Ovary 6-celled. Fruit (immature) ovoid or ellipsoid, 2 cm. long, appressed-pubescent, not at all sulcate, the pyrenes 30 to 40, all vertical Bracteoles subtending the flowers and fruits two, linear-lanceolate, pubescent, about 5 mm. long.

BRITISH NORTH BORNEO. Sandakan, *Villamil 129, 252 bis* (type), February 2 and November 25, 1916, in open places and brush-lands, altitude 80 to 110 meters, flowers white. fruits green.

A species well characterized by its rather large, sessile or subsessile leaves which are gradually narrowed to the slender base, and its solitary, short-pedicelled, rather large, 6-merous flowers. It apparently belongs in the group with *Timonius subsessilis,* Val., but is not closely allied to this species or the others placed near it by Valeton, but seems to be closely allied to *Timonius palawanensis,* Elm., which was described from staminate specimens.

Timonius involucratus, sp. nov.

Arbor, floribus fructibusque exceptis glabra; *ramis* ramulisque teretibus; *foliis* coriaceis, ellipticis ad oblongo-ellipticis, utrinque subaequaliter angustatis breviter obtuse acuminatis, usque ad 18 cm. longis, petiolatis, nervis utrinque 6 ad 8 prominentibus, venis reticulatis, supra impressis, subtus valde obscuris; stipulis late obovatis, rotundatis, 2.5 cm. longis, imbricatis; *fructibus* solitariis, brevissime pedicellatis, axillaribus, depresso-globosis, junioribus 1.5 cm. diametro, extus adpresse pubescentibus, pyrenis verticalibus, circiter 18, sepalis persistentibus, inaequalibus, late ovatis, 7 ad 10 mm. longis; *bracteolis* late ovatis, 2.5 ad 3 cm. longis, integris vel trilobatis, in siccitate subcoriaceis, brunneis, obtusis, fructibus involucrantibus.

A glabrous tree except the flowers and fruits. Branches terete, reddish-brown, the ultimate ones about 3 mm. in diameter, striate. Leaves coriaceous, elliptic to oblong-elliptic, brown and slightly shining on both surfaces when dry, 10 to 18 cm. long, 5 to 10 cm. wide, subequally narrowed to the decurrent-acuminate base and the shortly blunt-acuminate apex; lateral nerves 6 to 8 on each side of the midrib, impressed above, prominent beneath, curved, anastomosing, the reticulations netted, impressed on the upper surface, rather close, very obscure on the lower surface; petioles stout, 1 to 1.5 cm. long; stipules brown when dry, subcoriaceous, broadly obovate, imbricate, 2 to 2.5 cm. long, nearly as wide, pubescent on the median portion inside, otherwise glabrous. Fruits solitary, depressed-globose, immature ones 1.5 cm. in diameter, the pericarp thick, corky, brittle, dark-brown inside, externally appressed-pubescent with somewhat ferruginous short hairs, the pyrenes about 18, all vertical; calyx-lobes persistent, brown when dry, broadly ovate obtuse, irregular, two larger ones about 10 mm. long, the three smaller ones 7 mm. long; pedicels pubescent, 2 to 3 mm. long; bracteoles persistent, forming an involucre surrounding and including the fruit, broadly ovate, 2.5 to 3 cm. long, about 2.5 cm. wide, obtuse, brown when dry, entire or distinctly 3-lobed, glabrous except at the base inside, subcoriaceous.

SARAWAK, *Native collector 1252* (*Bur. Sci.*).

A remarkable species apparently not closely allied to any previously described form. It is well characterized by its nearly sessile, axillary, solitary fruits, the prominent, irregular, broadly ovate, persistent calyx lobes, the very large bracteoles forming an involucre about the fruits; and the large stipules.

Timonius hirsutus, sp. nov.

Frutex vel arbor; *foliis* oppositis, chartaceis ad subcoriaceis, ovato-ellipticis ad obovato-ellipticis, usque ad 25 cm. longis, utrinque plus minusve hirsutis, supra castaneis, subtus brunneis, apice breviter acute acuminatis, basi decurrento-acuminatis, nervis utrinque 9 to 11 prominentibus, venis reticulatis; stipulis oblongo-lanceolatis, hirsutis, acuminatis, 2 cm. longis; *floribus* ♂ axillaribus, dense confertis, circiter 1.5 cm. longis, 5-meris; *calycis* lobis 5, oblongis, obtusis, circiter 6 mm. longis, utrinque hirsutis.

A shrub or tree, the branchlets, petioles, leaves on both surfaces, and the dense inflorescences more or less fulvous or ferruginous-hirsute. Branches pale, nearly glabrous, the branchlets dark-brown or castaneous, fulvous-hirsute with spreading, scattered, short hairs. Leaves opposite, chartaceous to subcoriaceous, ovate-elliptic to obovate-elliptic, 20 to 25 cm. long, 11 to 13 cm. wide, the apex shortly acute-acuminate, base narrowed, decurrent-acuminate, the upper surface castaneous, shining, the midrib and nerves rather densely fulvous-hirsute, the surface with scattered similar hairs, the lower surface brown or pale-brownish, subferruginous-pubescent on the midrib, nerves, and reticulations; lateral nerves 9 to 11 on each side of the midrib, prominent, curved, anastomosing, the reticulations distinct, netted, the primary ones lax, subparallel; petioles rather densely fulvous-hirsute, 1.5 to 3 cm. long; stipules oblong-lanceolate, coriaceous, acuminate, about 2 cm. long, 8 mm. wide below, dorsally rather densely fulvous-hirsute, inside pale-pubescent. Inflorescences axillary, the flowers densely crowded in congested cymes, the peduncles scarcely 3 mm. long, all parts more or less ferruginous-hirsute. Staminate flowers sessile, about 1.5 cm. long. Calyx tube 5 mm. long, ovoid, externally densely fulvous-hirsute, dark-brown, inside densely pubescent with paler, shining hairs, the lobes 5, oblong, obtuse, 6 to 7 mm. long. Corolla-tube 1 cm. long, externally densely pale-pubescent, the lobes 5, spreading, oblong-ovate, obtuse, 4 to 5 mm. long. Bracteoles lanceolate, acuminate, pubescent on both surfaces, 9 to 11 mm. long.

SARAWAK, Baram District, Miri, *Hose 651,* April 20, 1895.

A most characteristic species, recognizable by its indumentum, its rather large leaves which are castaneous above and pale-brownish beneath, and especially by its very densely crowded flowers. It does not appear to be very closely allied to any previously described species.

Timonius heterophyllus, sp. nov.

Arbor parva, partibus junioribus inflorescentiisque ferrugineo-pubescentibus, ramis teretibus glabris, ramulis distincte 3-angulatis; *foliis* oppositis, superioribus ternatis, oblongo-obovatis, acute acuminatis, basi angustatis, rotundatis vel leviter cordatis, subsessilibus, usque ad 17 cm. longis, nitidis, subtus leviter pubescentibus, nervis utrinque 8 to 10, prominentibus; venis reticulatis; stipulis lanceolatis, tenuiter acuminatis, pubescentibus, circiter 12 mm. longis; *inflorescentiis* ♂ axillaribus, pedunculatis, dichotomis, ramis spicatim unilateraliter 3- ad 6-floris; *floribus* 5-meris, junioribus circiter 12 mm. longis.

A small tree, the branches pale, glabrous, terete, the branchlets about 3 mm. in diameter, glabrous, distinctly 3-angled. Lower leaves opposite, the upper ones ternate, chartaceous, oblong-obovate, 11 to 17 cm. long, 4 to 7 cm. wide, subsessile, the apex shortly acute-acuminate, narrowed below to the rounded or somewhat cordate base which is 1.2 to 1.5 cm. wide, the upper surface dark-brown when dry, shining, glabrous, the lower pale-brown, appressed ferruginous-pubescent on the midrib and nerves and with short scattered pale hairs on the epidermis; lateral nerves 8 to 10 on each side of the midrib, prominent, somewhat curved, anastomosing, the reticulations netted, slender, indistinct; petioles pubescent, 1.5 mm. long or less; stipules lanceolate, slenderly acuminate, 12 mm. long, dark-brown when dry, slightly pubescent, coriaceous. Staminate inflorescences axillary, peduncled, the rachis and branches rather densely fulvous-pubescent, the former up to 2.5 cm. long, the branches two, spiciform, up to 2 cm. in length, spreading, bearing 3 to 6 sessile unilaterally arranged flowers, the bracteoles densely pubescent, oblong to oblong-lanceolate, obtuse to acuminate, 2 to 4 mm. long. Calyx cup-shaped, about 7 mm. long, dark-brown when dry, densely fulvous-pubescent at the base, otherwise sparingly pubescent externally, inside rather densely pale-pubescent, with 5 short, obscure teeth, eventually irregularly 2- or 3-lobed. Corolla (buds) 12 mm. long, externally densely appressed pale-pubescent, the lobes 5, oblong, obtuse, thickened and keeled inside. Anthers 5, linear, 4.5 to 5 mm. long.

British North Borneo, Khota Balud to Kibaya, trail to Mount Kinabalu, *Mrs. Clemens 9811,* October 28, 1915.

A species well characterized by its sessile or subsessile opposite and ternate leaves. I know of no other species of the genus that has ternate leaves except the very different Philippine *Timonius ternifolius,* (Bartl.) F.-Vill. It apparently belongs in the same group as *Timonius anodon,* Miq.

Timonius clementis, sp. nov.

Arbor parva, glaberrima; *foliis* coriaceis, oblongo-obovatis, usque ad 17 cm. longis, apice breviter acute acuminatis, deorsum angustatis, basi cuneatis, nervis utrinque circiter 10, adscendentibus, curvatis, prominentibus, venis reticulatis utrinque valde obscuris; stipulis lanceolatis, acuminatis, 2.5 cm. longis; *fructibus* axillaribus, solitariis, pedunculatis, ovoideis, circiter 1.4 cm. longis, glabris calycis tubo lobisque intus pubescentibus exceptis; *pyrenis* circiter 18, omnibus verticalibus.

A small tree, entirely glabrous except the persistent calyx-tube and lobes (flowers not seen). Branches pale-brownish, terete or obscurely 4-angled, the internodes 5 to 10 mm. long, the petiolar scars prominent, the ultimate branchlets 4 to 5 mm. in diameter, the growing parts smooth, reddish-brown. Leaves oblong-obovate, coriaceous, brown and shining when dry, the lower surface paler than the upper, 14 to 17 cm. long, 6 to 7 cm. wide, apex shortly acute-acuminate, narrowed from about the middle to the cuneate base; lateral nerves about 10 on each side of the midrib, somewhat ascending, prominent, anastomosing, the reticulations very obscure on both surfaces, netted, sometimes nearly obsolete; petioles dark reddish-brown to nearly black when dry, 1 to 1.5 cm. long; stipules lanceolate, glabrous, slenderly acuminate, 2.5 cm. long, dark-brown when dry. Fruits axillary, solitary, their pedicels 1 cm. in length, the bracteoles lanceolate, acuminate, 4 to 5 mm. long. Fruits ovoid, about 1.4 cm. long, dark-brown or nearly black when dry, terete, glabrous except the inside of the short calyx-tube and lobes which are here appressed-pubescent, the tube about 1 mm. long, 2.5 mm. in diameter, the lobes 4, oblong-ovate, acute or acuminate, about 3 mm. long. Pyrenes about 18, all vertical.

British North Borneo, Mount Kinabalu, Marai Parai Spur, *Mrs. Clemens 11078,* December 2, 1915, on a forested ridge, altitude about 2000 meters, the fruits green.

The alliance of this species is clearly with *Timonius koordersii,* Valeton, of Celebes, from which it differs in numerous characters, notably its lanceolate, slenderly acuminate, much longer stipules, thicker, somewhat smaller leaves, shorter pedicels, and fewer pyrenes.

COMPOSITAE.

Lactuca, Linnaeus.

Lactuca retrorsidens, sp. nov.

Herba nana, glabra, 6 ad 10 cm. alta, *foliis* omnibus radicalibus, longe petiolatis, oblongo-obovatis, 1 ad 3 cm. longis, apice rotundatis apiculatisque, deorsum angustatis, basi cuneatis, margine dentibus minutis sparsis retrorsis vel patulis instructis; *capitulis* solitariis, circiter 7.5 mm. longis, circiter 10-floris, longe graciliterque stipitatis, squamis exterioribus numerosis oblongis ad oblongo-ovatis 1.5 ad 3 mm. longis, interioribus circiter 8 anguste oblongis 6 mm. longis obtusis apice minute ciliatis.

A dwarfed, glabrous, perennial herb 6 to 10 cm. high, the roots thickened, the very short caudex 1 cm. long or less, including the persistent bases of the petioles about 5 mm. in diameter. Leaves all radical, long-petioled, the blades greenish-olivaceous when dry, obovate to oblong-obovate, submembranaceous to chartaceous, 1 to 3 cm. long, 5 to 10 mm. wide, apex rounded and apiculate, gradually narrowed below, the base cuneate to decurrent-acuminate; lateral nerves few, very slender, obscure; petioles 1.5 to 6 cm. long, the margins on each side with from two to five short, slender, acute, retrorse or spreading teeth 1 mm. long or less. Heads solitary, about 7.5 mm. long, the scapes slender, 5 to 8 cm. long. Outer bracts oblong to oblong-ovate, obtuse, glabrous, 1.5 to 2 mm. long, succeeded by several oblong, 3 mm. long bracts, the innermost involucral bracts about 8, narrowly oblong, about 6 mm. long and 1 mm. wide, the obtuse apices obscurely ciliate. Flowers about 10 in each head, yellow. Achenes 1.2 mm. long, somewhat compressed, glabrous, slightly narrowed at the apex, scarcely beaked, the pappus brownish, copious, about 4 mm. long.

British North Borneo, Mount Kinabalu, Low's Peak, *Mrs. Clemens 10623,* November 13, 1915, in rock crannies above the summit lakelet, the roots with milky juice.

A very characteristic dwarfed species, readily distinguishable by its solitary heads; its long-petioled, obovate to oblong-obovate leaves; and the few, characteristic, retrorse or spreading, minute marginal teeth on the leaves.

Lagenophora, Cassini.

Lagenophora gibbsiae, sp. nov.

Foliis oblanceolatis vel lineari-oblanceolatis, integris, numerosis, 1.5 ad 2 cm. longis, obtusis vel subacutis, glabris, nervis lateralibus obsoletis; *capitulis* circiter 8 mm. diametro, pedunculis 4 ad 11 cm. longis, sursum leviter pubescentibus foliis 3 ad 5 plus minusve reductis instructis; *acheniis* 2.5 mm. longis, oblongo-obovatis, compressis, sursum obscurissime papillatis.

A tufted, nearly glabrous, perennial plant, the roots apparently not thickened as in *Lagenophora billardieri,* Cass. Leaves numerous, rosulate, oblanceolate to linear-oblanceolate, 1.5 to 2 cm. long, 2 to 3 mm. wide, chartaceous or subcoriaceous, olivaceous and shining when dry, glabrous, entire, the apex acute to obtuse, narrowed below, scarcely petiolate, the midrib evident on both surfaces but the lateral nerves and reticulations obsolete. Scapes 4 to 11 cm. tall, each bearing a single head, sparingly pubescent above, each bearing from 3 to 5 more or less reduced, scattered leaves, the uppermost ones 5 to 7 mm. long. Heads about 8 mm. in diameter. Involucral bracts numerous, in general oblong, 3 to 4 mm. long, 1.5 to 1.7 mm. wide, rounded, glabrous except the slightly ciliate apices, when fresh dull-red. Ray flowers white, tinged with pink, the corolla-tube 0.5 mm. long, the limb about 2 mm. long, somewhat navicular, entire, fertile, the achenes compressed, 1.5 to 1.8 mm. long, slightly papillate near the apex, otherwise glabrous. Disk-flowers numerous, yellow, the achenes similar to those of the ray-flowers. Corolla 2 to 2.5 mm. long, the tube short, the limb somewhat campanulate, 4-cleft. Anthers 0.5 mm. long. Style-arms less than 0.5 mm. long. Mature achenes brown, compressed, oblong-obovate, 2.5 mm. long, 1.3 to 1.5 mm. wide, glabrous except in the apical parts where they are obscurely papillate.

BRITISH NORTH BORNEO, Mount Kinabalu, above Paka Cave, *Mrs. Clemens 10560,* November 13, 1915, altitude about 3300 meters, associated with *Centrolepis* and *Potentilla.*

This species, dedicated to Miss L. S. Gibbs, is doubtless the one represented by her *No. 4202,* reported by S. Moore* as a Composite with the habit of *Lagenophora,* but with the flowering heads not sufficiently advanced to allow a certain generic identification of the specimen. Mrs. Clemens's specimens present some heads in full anthesis and others with mature achenes, from an examination of which it is very evident that the plant belongs in the genus *Lagenophora.* The species is apparently most closely allied to the only other one known from the Malayan region, namely *Lagenophora billardieri,* Cass., from which it is readily distinguishable by its much narrower, differently shaped, entire, glabrous leaves, its somewhat leafy scapes, and its differently shaped achenes.

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* Journ. Linn. Soc. Bot. **42** (1914) 99.

A Rice-Ceremony.

By R. O. Winstedt.

In his account of rice-ceremonies in *J. R. A. S.* No. 29, p. 8, 1896, Mr. C. O. Blagden, writes:—"at planting there are also ceremonies. Sometimes there is a special service known as *băpua,* consisting of a sort of mock combat, in which the evil spirits are believed to be expelled from the rice-fields by the villagers: this is not done every year, but once in three or four years." He remarks that *băpua* is the Minangkabau pronunciation of *bĕrpuar* and that *puar* is a plant, whose stem is used in the mock-combat. Mr. Skeat quotes this on p. 250 of *Malay Magic;* in Selangor, he adds, this mock-combat is called *singketa.*

Two years ago, I saw this combat take place at Johol. Two parties assembled one on each side of a gully and hurled the *puar* rods across at one another, till a blow in the face gave one of the combatants a bloody mouth and spoilt the fun. It lasted about half an hour. The rods or darts were about 3½ feet long, thin green and straight, and the pared root gave them a flat end like that of a stethoscope: it was this flat end which was thrown foremost. It has been suggested to me that they are stems of a ginger-plant. A *pawang* opened the proceedings with an invocation. The purpose was to expel all evil influences from the fields before planting. I was informed that *singketa* is a more serious combat with heavier weapons—*batang pisang,* if I remember rightly.

Lexicographical coincidences in Khasi and Malay.

By R. O. Winstedt.

Sir George Grierson reviewing Pater Schmidt's 'Die Mon-Khmer-Völker Zentralasiens und Austronesiens' in Vol. I, 1907, of the *J. R. A. S.*, pp. 187-191, observes how Schmidt has shown that there exists in Further India an important group of languages, embracing Mon, Khmer, Palaung, Wa and a number of minor forms of speech, including Sĕmang and Sakai, which was neither Thibeto-Burman nor Sinitic, while on the other hand it was closely related with the Khasi spoken in Central Assam. We have "presented to our view, a group of cognate languages reaching from the Punjab, through Central India, Assam, the Nicobars and Further India to the Malay Peninsula." This group, which Schmidt termed the Austroasiatic family falls into several sub-groups:—

I. (*a*) Semang.
  (*b*) Sĕnoi, Sakai and Tembe.

II. (*a*) Khasi.
  (*b*) Nicobar.
  (*c*) Wa, Palaung, Reang.

III. (*a*) Mon-Khmer.
  (*b*) Munda.
  (*c*) Cham, etc.

Schmidt surmises "that the first two are in a stage of development earlier than that of the last, a fact which is important for determining the relative times of the migration of each group to its present seat." In 1899 Schmidt connected this Austroasiatic group with the Austronesian group in a paper which may be read conveniently in the *Bulletin de l'École Française d' Extrême-Orient,* tome VII, 3 and 4, under the title 'Les Peuples Mon-Khmer, trait d' union entre les peuples de l' Asie centrale et de l' Austronésie.' Since that paper appeared, the connection has been accepted. There is affinity between Khasi and Malay; and my present paper is an attempt by one acquainted with Malay to give further evidence. For Khasi I have used the *Khasi-English Dictionary* by U. Nissor Singh, (Shillong, 1906).

This paper is not strictly scientific. Now that the *R. A. S.* has printed Mr. Blagden's translation of Brandstetter's philological essays, there is no excuse for students of the Malayan languages to be ignorant of the methods of scientific philology. Each language of a group should first be compared with its own immediate cognates, *e.g.* Khasi with Nicobarese, Wa, Palaung, etc., before it is compared with distant relatives. From such a comparison we can discover the limits of phonetic variation of the individual sounds and can often deduce from the modern forms a more archaic form for each group. We ought, for example, to get at the original or primitive Austroasiatic and Austronesian forms respectively and then compare; not compare modern Malay with modern Khasi. It is not enough to assume that a Malay *t* can be represented by a *t* in Khasi: it should be shown that an Austronesian *t* is in a whole series of cases represented by a *t* in the Austroasiatic group and that that *t* is retained unchanged in the two modern languages. Only then can we assume that the Malay *t* or *b* or *n* corresponds with the Khasi *t* or *b* or *n* and so that Malay words and Khasi words containing similar roots are really related.

I have neither time nor opportunity for this scientific thoroughness. But I venture to print the list given below for one cogent reason. Scholars in Europe with a book knowledge of Malay are apt to miss nuances of meaning familiar to those accustomed for years to hearing the language spoken; and so to overlook real affinities. For most of the coincidences given in my list are very close and remarkable, and one has only to glance at them to see that many are coincidences the most rigorous philological method could not reject; coincidences not only of root but of duosyllabic and trisyllabic words.

One is tempted to connect the Khasi 'Rynkhiang' *dry, parched* with the Malay 'Rĕngkiang' *granary*, 'Shynkup' *first room in Khasi house, enclosed porch* with 'Sĕngkuap' *a lean-to, kitchen adjunct;* 'Mangkalai' *long legged of fowls* with 'Mĕngkalai' *unfinished, having long trailing ends; of mat-work.* Malays have a Hantu Sungkai, Khasis a Syngkai Bamon (= Brahmin). May 'Anak Dara Sunti' *virgo intacta* and 'Sunting' *to pluck a flower actually or figuratively* find their explanation in 'Syntiw' *a flower?* Possibly Khasi throws light on some unexplained place-names in the Peninsula: Sungai Tĕriang is a common name for a river: 'Tĕriang' in Khasi means *eel.* 'Naneng' in Khasi means *from above.*

Malay.	*English.*	*Khasi.*	*English.*
Bengkok Cf. Tagalog Pangkok	*bent.* *to curve, bend.*	Pynkhoh	*to curve, bend, wrestle.*
Tingkap	*thatched dropping windows in walls of Malay house.*	Tyngkhap Tyngkhap-tyngkhip	*insert, hide, infix;* *carefully hidden.*
Tangkap Tĕkap	*seize.* *close mouth with hand.*	Khap	*gripe, fasten, close.*

Malay.	*English.*	*Khasi.*	*English.*
Dakap	*embrace.*	Kàp, Ia-Kàp	*to join in friendship, match.*
*Kukur	*scrape.*	Khur	*scrape.*
Kukuran	*scraper.*		
Rangkum	*as much as one can grasp in the hand.*	Khum	*fasten, tie, bind.*
Kongkum	*folding the wings close (of a bird.)*		
Gĕnggam	*carry in closed fist.*	Kham	*closed fist.*
Kwet	*paddle with oar or hand after object.*	Khwait	*ply the hand like a duck while swimming, paddle.*
Wet	*paddle with kicking stroke of single oar.*		
Kait	*pluck fruit by cutting with knife at end of pole.*	Kheit Kait	*pluck, gather.* *scissors.*
Chĕkak	*pinch, tie together.*	Khak	*tightly, firmly.*
Dĕngkur	*snore.*	Syngkhor	*snore.*
Kakak (Jav. Kakang, Kang)	*elder brother or sister.*	Kong	*elder brother or sister.*
Kia, Bĕkia	*chain stitch.*	(Bam bud-) khia	*lit. eat fold stitch, to stitch.*
Kong	*rib of boat.*	Pyrkhung, Pyrkhun	*to bend, arch.*
Kĕlong	*curved; arched.*		
Gĕlong	*loop of rattan.*	Khun	*bend or drag a thing to oneself.*
Kĕlun	*spirals of smoke.*	Kĕlong	*bottle-gourd, heart.*
Kangkang	*waddle.*	Kán-kán	*waddle.*
Lĕngang	*sparse of population.*	Lyngang	*lonely.*
Tĕngong-tĕnging	*walking absent-mindedly, mooning.*	Ngeng-ngeng Tynghong Tyngheng	*drowsily, heavily.* *agape.* *agape, spell-bound.*
Jĕngok	*peep, peer as through crevice.*	Jngoh	*look, peep in.*
Nyut	*throb of boil or fontanel.*	Kynjut	*throb.*
Kĕrnyut	*nervous convulsion.*		
Nyah	*to drive away.*	Ñiah	*to drive cattle, herd.*
Banyak	*much, greatly, many.*	Niak	*much, greatly.*
(Mĕlachak) yak	*abundant of fruit.*		
Sĕngap	*quiet, of a child.*	Sngap	*to listen.*
Tĕrginjat-ginjat	*on tiptoe.*	Kynjat	*a pace.*
Kĕchap	*smack the lips, taste; water, of one's mouth.*	Kjap	*absorb, sip, suckle.*
Jĕrap	*absorb.*		
Kĕchup	*kiss with the lips.*	Kjup	*suck, draw by suction.*
Jap	*completely.*	Jhop	*completely.*

Malay.	*English.*	*Khasi.*	*English.*
Tĕrkĕjang	*stretching the limbs to full length.*	Kjèng	*to the full height.*
		Ieng	*to stand, rise up.*
Lĕjang, Rĕjang	*the length of a horse's spring in the air.*	Ljang*	*hanging down, suspended of an object in the air.*
Tĕrkĕrjang	*kicking out with hind-legs, of a horse.*		
Lĕnyap	*lost, vanished.*	Yap	*die, be lost.*
Datok	*grandfather.*	Kthau	*grand-father.*
Kĕtua	*elder.*		
Tuan	*master.*		
Kutok	*accursed.*	Kutok	*old.*
Orang tua kutok	*old and accursed.*		
Atap	*covering, thatch of house.*	Tap	*to cover, screen.*
		Satep	*thatch at roof-ridges.*
Kĕtam	*crab.*	Thám	*crab.*
Ĕndap	*waylay.*	Ap, thap, ap-thap	*wait for, waylay.*
Lontar	*hurl stones.*	Lynther	*throw stones at one place constantly;*
Lintar	*thunder-bolt.*	Lon	*to hurl stones.*
Sĕdang	*engaged in, intermediate, while.*	Sdang	*begin, commence.*
Pĕdor	*curved, deformed of shin-bone.*	Dór	*distorted, curved;*
		Kdór	*bend, curve.*
Badang (*Pen.*) Gadang (*Sum.*)	*round wicker sieve for winnowing, large circular flat wooden tray.*	Pdung	*circular sieve or flat winnowing basket.*
Kĕdang	*with limbs extended.*	Lyngkdang, Ldang	*lying helpless on the back.*
Lentang	*lying on one's back.*	Lyndang	*lie on one's back.*
Bunting	*pregnant.*	Pongding	*pregnant.*
Padam	*dout, extinguish, quash.*	Pdam	*come to an end, cease, be disappointed.*
		Dam	*obliterated.*
Endul, ĕnduï	*to swing.*	Doï-Doï	*swinging, to and fro.*
		Padoï	*to swing.*
Sadur	*plating; overlay with shining metal.*	Sadur	*tin.*
Kĕrdam,	*thumping noise.*	Kdam	*with a slam.*
Kerdum-kĕrdam		Kyrdem	*stamp with the foot.*
Lindat	*beaten down, of grass.*	Dat	*beat.*
Kĕndong	*carrying in fold of skirt or cloak.*	Kyndong	*carefully wrapped, of small things.*

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* Cf. *sa-lĕjang kuda bĕrlari* 'the distance of a horse's spring' with the Khasi '*u kulai uba jrong kjeng*' the pony which is tall stretching to full height'.

Malay.	*English.*	*Khasi.*	*English.*
Piak	*strip of betel-leaf.*	Piah, Phiah	*to split.*
Sěpuï-sepuï Kěpul	*blowing gently of wind.* *clotted, of smoke.*	Pui-pui	*dust in the air, mist.*
Kěpoh	*bulging of sails.*	Kpoh	*abdomen, household (Cf. Mal.* Pěrut.)
Punpun Děpun	*bunch up end of shawl.* *lining.*	Jain-pun*, Jingpun, Jympun	*fold in outer garment for storing odds and ends.*
Lampai	*fine and long.*	Lympeh	*fine and long.*
(Gila) Sěpěra Chěmpěra	*scatter-brained, mad.* (*Pk.*) *scattered.*	Sapra	*to scatter.*
Lumbong	*mine-pit.*	Pong	*to make a hole.*
Raba	*to feel, grope.*	Tba	*to feel by touching.*
Tambah (Ayer) Bah	*grow bigger.* *flood, big water.*	Bah Um-bah Wah-bah	*big.* *overflow.* *large river.*
Baham	*devour.*	Bam	*eat,* (*am bite.*)
Tělan	*swallow whole.*	Tyllan Bam tyllan	*utterly.* *devour.*
Lěbum-lěbam	*banging noise.*	Bhum-bham	*confusion of noises.*
Lambong	*flank, side.*	Lěbong	*thigh.*
Kělěbut	*fez-rest.*	Kulbut	*arched wooden frame.*
Kěbam	*to turn in the lips.*	Kbum Kyrbam	*close the lips.* *bite nether lip.*
Bawa Běban	*carry.* *load, burden.*	Bah Bahbang	*carry.* *carry load on stick.*
Subur	*rapidly growing of plants.*	Sbur	*rich of soil.*
(Sa-tali) Bun	*a set (of verses strung together.)*	Bún, Shibún (Shi	*many, much.* = *one.*)
Mata	*eye; knob in tree.*	Mat Mat	*eye.* *joint, knob. ..*
Mamak	*aged uncle; maternal uncle.*	Mamak	*maternal uncle.*
(Nasi) Lěmang	*rice cooked in a joint of bamboo with the top node cut off.*	Lmang	*having the head cut off e.g. of a stick.*
(Těr)-Gěramang Těrgamam	*taken aback.*	Kmang	*agape, eagerly.*
Layar	*sail.*	Yar	*wide, open, extended.*
Děru Rioh	*clamour.* *roar.*	Riu	*to resound.*
Garut	*scrape.*	Khrûd	*to scrape.*
Chěrai Chěrai-běrai	*divorce, separate.* *scattered.*	Khrai Brai Krei	*to sever, cut across.* *asunder, e.g. of snapped string.* *to scatter.*

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* "Jain"=Malay, "Kain," *garment.*

Malay.	*English.*	*Khasi.*	*English.*
Bĕrpĕrai-pĕrai	*abundant and littered, of fruit.*	Prai	*many and in large numbers.*
Jarang	*interspace.*	Jarang	*hole or chink where fish dwell.*
Riang	*eddy.*	Khriang	*a rapid.*
Riak	*eddy.*		
Kĕriat	*creak of doors or oars in rowlooks.*	Kiriat	*gnash teeth.*
Irup	*suck up liquor from spoon or cup.*	Jrùp	*a dip.*
		Bam jrup-jrap	*to eat at the same time.*
Rap	*cultivated, of land.*	Rep	*to cultivate.*
Pĕrap	*to fly at an enemy, of fowl, women.*	Prup-prap	*simultaneously and hurriedly.*
Sa-dĕrap	*all together.*	Ia-rap	*to help.*
Bĕrdĕrau	*to plant rice by co-operative labour.*	Riau	*in great numbers and simultaneously.*
		Rap riau baroh	*help all together in great numbers.*
Bĕrahi	*to desire passionately.*	Brái	*like, be fond of.*
Karong	*small sack.*	Iarong	*small net bag.*
		Ka iarong	*a small net bag.*
Kĕliling	*around.*	Kylla	*to turn, change.*
Giling	*to roll (with roller.)*	Kyllain	*to wind, be inconstant.*
Gulong	*to roll up.*	Kylla-Lieng	*to capsize.*
Guling	*to roll over.*	Lieng	*canoe.*
Malam	*night.*	Slem	*long, late.*
Silam	*evening.*		
Aleh	*change, transfer.*	Ia-pli	*exchange.*
Sileh	*substitute, compensate.*		
Jav. Palih	*half.*		
Kĕlit	*dodge behind tree or person.*	Klit	*sleight of hand; very quickly.*
		Pyngklit	*to go by round about way to avoid meeting.*
Gĕli	*nervously disgusted.*	Jli	*nauseated.*
Bular	*pale discoloration of the eye.*	Blar-Blar	*pale of the eyes.*
Alur	*channel.*	Lur	*to plough.*
Jalur	*broad strip or line in rice-field.*		
Lalang	*a long grass.*	Lang, Phlang	*grass.*
Kĕlip-kĕlip	*flickeringly.*	Khleb-khleb	*flickeringly.*
		Lep	*flaringly.*
		Lip	*to go out, be extinguished.*
Chĕlup	*immerse, steep, dye.*	Jyllop	*drowned.*
		Yap jyllop	*die of drowning.*
Tuar	*riverine fish trap.*	Kuar	*fish-trap set in rapids.*

Malay.	*English.*	*Khasi.*	*English.*
Asu	*canine, of teeth.*	Ksew, 'Sew	*dog.*
Kisep	*shrunken, lacking a kernel.*	Sep	*having no grain inside a pod.*
Kesip	*to nip e.g. hard sugar in front teeth.*	Sip	*break a thing, as an acorn between the front teeth.*
Sĕsat	*astray.*	Sohsat	*be in trouble, be entangled.*

Instances of Metathesis

Uman	*harp on a story.*	Hunam	*harp on one story.*
Litup	*cover and conceal.*	Tyllup	*cover completely.*

Those interested in the subject should consult Schmidt's "Grundzüge einer Lautlehre der Khasi-Sprache in ihren Beziehungen zu derjenigen der Mon-Khmer-Sprachen," (München 1904).

Changes in Malay Reduplicated Words.

By R. O. Winstedt.

Definite classes of change in the second of Malay reduplicated words may be distinguished; the resulting compound having the usual significance of reduplicated words.

I. The first letter of the word to be reduplicated is changed into B in the second word.

> Halai-balai *confused;* ingar-bangar *great uproar;* sara-bara *confusion;* chĕrai-bĕrai *scattered;* cheret-beret *continual diarrhoea;* haru-biru *confusion, disturbance.*

II. The first letter is changed into M in the second word.

> Choreng-moreng *all striped;* kawin-mawin *wedding festivities;* charut-marut *gross obscenities of expression;* changkeh-mangkeh *sticking out everywhere;* sayur-mayur *vegetables;* miap-tiap *every;* sĕrta-mĕrta *immediately.*

III. Vocalization is changed in the second word, U or O of the first syllable of the first word becoming A, and A of the second syllable becoming E or I.

> Olak-alek, bolak-balek, kolak-kalek *backwards and forwards;* golak-galek *topsy-turvy;* upak-apek, lopak-lapek *talking this way and that, inconsistently;* dolak-dalek *prevarication, shilly-shallying;* chorak-charek, chobak-chabek, robak-rabek *tattered, frayed;* onyak-anyek *vacillating;* kosak-kasek *fidgetting;* porak-parek *helter-skelter;* komak-kamek *masticating;* kopak-kapek *pendulous, swaying to and fro.*

> Untal-antil, kontal-kantil *swaying to and fro* (*of short thick objects*) ; untang-anting, kontang-kanting *swaying* (*of long objects*) ; ulang-aling *to and fro;* bolang-baling *chain-shot;* cholang-chaling, kolang-kaling *confused;* chompang-champing, rompang-ramping *tattered, frayed;* dongkang-dangking *very emaciated;* pontang-panting *helter-skelter;* jongkang-jangking *rising and falling irregularly.*

> Bongkar-bangkir *turn upside down, confused;* chobar-chabir *tattered;* chongkar-changkir *of all sizes;* chongkah-changkeh *with ups and downs, crooked;* rondah-randeh *in confusion;* kochah-kacheh *fiddling with;* komat-kamit *mouthing* (*food*).

IV. O or U of the first syllable changes into A, and so, too, U of the second; in a very few instances.

Runggu-rangga *bristling;* rundu-randa *erratic;* sungkur-sangkar *sprawling;* huru-hara *disturbance;* susup-sasap *up and down, over and under.*

Gopoh-gapah *hurry-scurry;* gonyoh-ganyah *scrub vigorously;* dongkor-dangkar *bundling out bag and baggage.*

V. A in the second syllable changes into I.

Jongkat-jongkit *see-sawing;* bĕnggal-bĕnggil *knobby;* ĕngkap-ĕngkip *up and down;* jongkar-jangkir *bristling;* sĕrba (Skt.)-sĕrbi *of all sorts;* chungkap-chungkip *panting;* kuas-kuis *scratching* (*of a fowl*); sĕrbah-sĕrbeh *shaking out a sarong.*

VI. + *ang* of the last syllable changes into + *ok* in the following.

Bengkang-bengkok, ĕnchang-ĕnchok *zigzag;* liang-liok, chĕledang-chĕledok *swaggering;* chĕlengkang-chĕlengkok *motion in curves or waves;* sibang-sibok *snatching as one passes;* bechang-bechok *the sound of quarrelling.*

VII. + *ang* of the last syllable changes into + *ek.*

Chonggang-chonggek *bobbing up and down;* golang-golek *swaying.*

VIII. + *ang* of the last syllable changes into + *ut* or + *it.*

Genjang-genjut, biang-biut, pinchang-pinchut *zigzag;* inchang-inchut, erang-erut *awry;* gĕliang-gĕliut *writhing;* unchang-unchit *by fits and starts;* tunggang-tunggit *bowing, bobbing up and down;* ungkang-ungkit *see-saw;* gĕntang-gĕntit *waving to a point* (*like a* kĕris).

IX. + *ok* of the final syllable changes into + *al.*

Ĕnggok-ĕnggal, onggok-onggal *rocking;* undok-undal *one after another in swift succession.*

X. A in the final syllable changes into U.

Chĕlam-chĕlum *tramping;* chĕlas-chĕlus *familiar;* jĕnggal-jĕnggul *notched;* chĕlup-chĕlap *sound of splashing;* kĕriat-kĕriut *creaking sound of oars.*

XI. And the following isolated usages occur.

Lauk-pauk *hotch-potch;* chĕkok-chĕkek *choking;* sĕrok-sĕrek *cracking of the finger-joints;* lĕsok-lĕsak *rustling;* takok-takak *notched;* cholak-chaling *confused;* lalu-lalang *passing to and fro;* sĕlang-sĕli *at intervals;* chĕbek-chĕbai *pout;* bĕlu-bĕlai *chatter;* chongak-changit *moving* (*the head*) *up and down;* bochor-bachir *very leaky;* sunyi-sĕnyap *deserted, solitary.*

Rules In Malay Chess.

BY R. O. WINSTEDT.

There is a paper on Malay Chess, by Mr. Elcum in *Journal XLIX*, and the game is discussed in Mr. R. J. Wilkinson's *Life and Customs, Part III, Malay Amusements* (Kuala Lumpur 1910). Some years ago I got a copy of the rules of Malay chess as played at Sri Menanti in Negri Sembilan; and I kept it by me, in case I should ever learn the game and so be qualified to discuss them. Perhaps I never shall learn, or perhaps the white ants may have devoured my MS. before I find time and inclination to learn. So, now I print the rules as they stand, in case they may interest players of chess.

(1) Tiap-tiap buah yang tĕlah di-usek, buah itu-lah juga akan di-jalankan.

(2) Boleh di-makan buah apa-apa suka, jika bĕrgaul sa-kali pun.

(3) Tiap-tiap bidak yang tĕlah naik ka-mĕrchu papan-nya boleh mĕnjadi ganti tĕmpat itu-lah; jika sampai ka-tĕmpat mantĕri, boleh jadi mantĕri; dĕmikian juga di-tĕmpat lain-nya.

(4) Bidak boleh bĕrjalan dua tapak pada pĕrtama bĕrjalan, kĕmudian sa-tapak sahaja.

(5) Raja tiada sa-kali-kali boleh bĕrgĕrak, jika sa-bĕlum kĕna sah.

(6) Jika tinggal satu bidak dĕngan sa-orang raja, maka bidak itu Maharaja Lela, boleh di-jadikan mantĕri atau lain-nya.

(7) Jika di-sah raja dĕngan tiada bĕrgaul, boleh juga raja itu mĕmakan mĕmukul buah yang sah itu, baik sa-tapak atau dua tapak sapĕrti jalan kuda atau jalan tih (? = tir *R. O. W.*)

(8) Jika tinggal raja sa-orang diri-nya, boleh-lah raja itu bĕrjalan sa-tapak-tapak atau sapĕrti lompat kuda.

(9) Apa-bila tĕlah bĕrjalan, hal-nya tĕlah tĕrlĕpas tangan; maka tiada boleh di-ubah lagi.

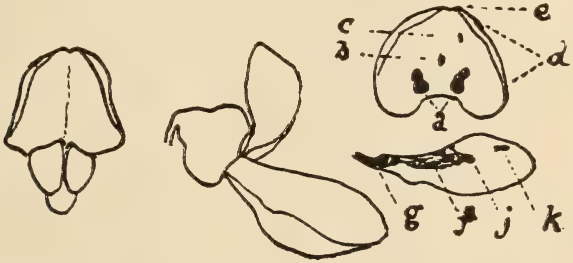
(10) Yang di-bangsakan sĕri—tiada kalah, tiada mĕnang—tinggal dua dĕngan satu mĕlainkan bĕrdua mantĕri.

A Note upon the Way in which Bees settle on Flowers of Derris thyrsiflora, and the Injury resulting from their Search for Honey.

By I. H. Burkill.

In the Botanic Gardens, Singapore, there is a large plant of *Derris thyrsiflora,* Benth., climbing over a tree of *Cyrtophyllum fragrans,* DC., near to the Director's house. Its stem has a circumference at the base of eighty centimetres; and it ascends to nearly 20 metres. When in flower it is very conspicuous, and attracts enormous numbers of bees, whose hum on the flowers is heard all day. Among the bees are *Apis dorsata,* L., *Apis indica,* F., *Xylocopa latipes,* F. rarely, *X. aestuans,* L., *Anthophora zonata,* L., and *Melipona sp.* Occassionally a butterfly visits also.

Owing to the height at which the flowers stand, it has been extremely difficult to take the insects; and the list is consequently imperfect.



The flower of *Derris thyrsiflora* in face and in side view × 2: the standard and right ala showing the places most injured by the bees.

The flowers are white with an undefined line of green down the centre of the standard. Their form is seen in the figures above.

In all their parts oxidation develops a black pigment: and by means of this it has been interesting to observe the injury which visitors do to the flowers; for injury results in oxidation.

The mechanism of the flower is typically papilionaceous. There is abundant honey within the staminal tube: the approach to it is by a wide opening upon either side of the free upper filament allowing easy access to those insects which can force apart the standard and the interlocked wings and keel sufficiently. The one effect of the forcing of these apart is injury to the claws of the petals which serve as springs, so that after visits they are suffused with the black pigment in consequence of rupture of the epidermal layer. The other effect is due to the feet and head of the visitors which they use in their effort to prise the flower open. Invariably as a consequence of this two dark spots develop at the base of the standard one on either side near the brow over the way to the honey. It is to be noted that this injury is invariable. And often these two areas can be seen to be made up of three or four confluent injuries, each resulting in a complete perforation of the limb. Corresponding with them may be seen perforations of the wings, which are less commonly confluent from being more dispersed. But of the wings still there is invariably damage about f., and also especially at the corner j. These places are close to the folds whereby the wings and keel are interlocked, but beyond them. Presumedly they are at the points where the visitors get the best purchase.

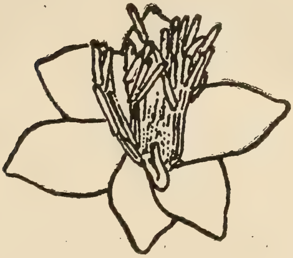
In other parts of the standard and the wings there is but inconstant and slight damage done: and the keel which has the function of protecting the pollen rarely is marked except in its claws and sometimes at the very tip.

In about 5% of the falling flowers injury to the standard had occurred near b., and in less than 5% at c. In a greater percentage some injury occurred right at the tip. The wings are rarely damaged at k.

The evidence is very clear that every flower gets repeatedly visited. But only a small percentage set seed as over 90% fall entire. The remainder however are sufficient to supply what may be regarded as quite an abundant seed-crop.

Plethiandra Sahebii, a new Melastomacea from Sarawak, described.

By I. H. Burkill.



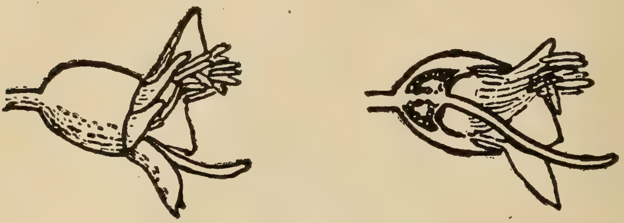
Flower of *Plethiandra Sahebii* seen from the front × 3.

The genus *Plethiandra* was created by Sir Joseph Hooker in 1867 for a plant collected by Motley on "Gunong Say," (?) Sarawak. He placed it in the Astronieae following after the genus *Kibessia.* Baillon, *Natural History of Plants,* VII, 1881, p. 63, Krasser in Engler's *Pflanzenfamilien,* III. Abt. 7, 1893, p. 196, and Cogniaux in De Candolle's *Monographiae Phanerogamarum,* VII. 1891, p. 1111, were unable to add anything to what Sir Joseph had done: so that the genus remained—as he had left it—of one little-known species, described, so Stapf testifies, upon "a rather poor specimen." Cogniaux, however, defined a genus *Medinillopsis,* l.c. p. [illegible], with two species,—*M. Beccariana* from Sarawak, and *M. sessiliflora* from Singapore, both collected by Beccari: and this genus Stapf in Hooker's *Icones Plantarum,* plate 2418 (1896), reduced to *Plethiandra.*

Stapf had added to the genus two years earlier, a new species, *P. Hookeri,* from the mountain of Kinabalu (*Trans. Linn. Soc. London,* Botany. IV. 1894, p. 163), before he reduced *Medinillopsis,* and at the time of reducing it he described also *P. rejangensis, P. sessilis,* and *P. cuneata,* all from Haviland's Bornean collections, so raising the number of species to seven, six from Borneo and one from Singapore. Further be suggested that Cogniaux's *Medinilla robusta* is also a Plethiandra.

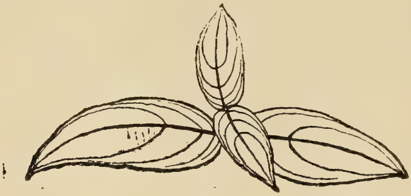
In adding to these another new species, I take the opportunity of figuring in outline from life its flower; for good as is the drawing of *P. Hookeri* in the *Icones* it was made from dried specimens, which do not permit the positions assumed by the stamens and stigma to be determined: and the flower is given as less markedly bisymmetric than it is likely to be.

As seen in *P. Sahebii,* the new species, the stamens take up a position above the stigma in horizontal flowers.



Flower of *Plethiandra Sahebii,* from the side and in median section × 3.

Plethiandra Sahebii is known from a single individual brought to the Singapore Botanic Gardens from Sarawak by a former employée—Mr. B. K. Saheb. It has been grown with the object of determination. It has no horticultural value.



Foliage of *Plethiandra Sahebii,* reduced to 1/3

Plethiandra Sahebii, as known, is a shrub about a metre high, branching dichotomously from the ground upwards, so that from four stems it ends in 16 branches bearing leaves. Between these branchings there may be as many as six internodes, or only one. In the axils of the old leaves it begins to flower, and from the axillary bud continues to flower after the leaf has fallen, apparently without limit of time, so that it is cauliflorous. As the leaves are paired this results in two cushions of tissue opposite to each other which continue producing flowers in fairly rapid succession; but of these only one, or rarely two, is open at one time. Laterally at the node from just above the level of the insertion of the leaves there arise early, say, about the time when flowers are appearing, adventitious rootlets, and others follow just below the level of the insertion of the leaves. If these rootlets find anchorage they become well developed, and ultimately the effect is produced of the plant flowering among its own roots; for the abbreviated axillary branch continues still to produce its flowers. Dichotomy is of course produced by the arrest of the terminal bud and the growth of the pair of axillary buds into leafing branches: where they are produced flowering still occurs for a second axillary bud arises below the first which becomes a cushion of flowers. The stems are glabrous; they are never exactly green, but when quite young are suffused with a dull claret colour becoming a livid brown, whereafter a greyish brown cork layer is developed, with lenticels rather abundantly scattered in it, and cracking longitudinally. The leaves are sessile, large, attaining 30 cm. in length by 12 cm. in breadth, ovate, rounded at the base, and where they touch, as they usually do, the tissues are apt to die on account of the water or damp earth caught and held by them, and into which the adventitious roots may find a way. When young the leaf-blades rise from the stem at an angle of about 60° but the angle at the base increases with age: above the middle the blade arches over: and the leaf-tip usually is pointed somewhat earthwards. The midrib is thick and prominent on the lower side of the leaf, but grooved above: at right angles from it arise 3 or 4 pairs of strong lateral nerves, as figured above, increasing in strength and in distance from each other upwards: the uppermost of these usually is at one-third of the length of the leaf from the axil: the lower of these pairs fade away under the margin but the top and strongest reaches the apex, and rejoins the midrib. The reticulum is indistinct, and mainly transverse to the long axis of the blade. The margins of the leaves are slightly undulate, and also slightly decurved. Both sides of the blade shine, the upper being darker than the lower. When old the axillary cushions from which the flowers are produced may be 1 cm. in diameter, and raised 4 mm. in the centre, which is studded with old pedicel-stumps. There may be as many as 10 buds present at one time in various stages of development, but one or rarely two open flowers only. The ovary with the calyx, indistinguishable without section, is of a reddish magenta, smooth and about 3 mm. long, the margin quite even. The petals are 6, contorted in the bud, expanded almost at right angles to the axis of the horizontal flower in anthesis, obovate-elliptic, up to 6 mm. long. The stamens are all directed to the upper side of the flower, and are usually 28 in number: the filament is 3 mm. long and the anther 2 mm. long: the filaments are attenuated just under the anther but not appendaged: the anthers are just spurred at the base, and dehisce by an apical pore. The style is 9 mm. long, decurved in its basal half so as to pass to the lower side of the flower, and then uprising towards the stigma. The receptacle is very concave, which accounts for part of the greater length of the style over the stamens. The loculi are 6, and the ovules are very numerous.

Plethiandra Sahebii, foliis *P.* (*Medinillopsi*) *Beccarianae* similis, facile distinguitur pedicellis et floribus: ab speciebus aliis generis praecipue foliis differt.

Frutex metralis, glaberrimus, ramis crassiusculis furcatis. *Folia* sessilia, ovato-elliptica, acuminata, ad 30 cm. longa, ad 12 cm. lata, nervis lateralibus utrinque 3 vel 4. *Flores* fasciculati, ex axillis foliorum vetustiorum atque foliorum delapsorum producti, purpurei, diametro 14 mm. *Calyx* margine aequalis. *Petala* 6, contorta, obovato-elliptica, obtusiuscula. *Stamina* plus minusve 28: filamenta 3 mm. longa: antherae minutissime bicalcaratae. *Ovarium* 6-loculare.

SARAWAK. Plantam singulam, eam quam ex vivo descripsi, anno 1907 ex sylvis prope Kuching, B. K. Saheb in Hortum Botanicum Singapurensem attulit ubi adhuc colitur.

The species of *Plethiandra* appear always to be glabrous: and probably all of them live in the shade in moss on tree trunks or sometimes on rocks, where moisture is constant. *P. Beccariana* possesses the largest leaves of the genus; for they attain 30 cm. in length by 16 in width. *P. Sahebii* goes with it in this respect. *P. rejangensis* has leaves up to 15 cm. by 7 cm. In other species they appear rarely to exceed 10 cm. No dimentions for *P. Motleyi* are available.

P. Beccariana also has the largest flowers, thus:—

	calyx.	*petals.*	*stamens.*
P. Beccariana ..	6 mm.	10 mm.	10-12 mm.
P. Sahebii ..	3 mm.	6 mm.	5 mm.
P. Hookeri ..	5 mm.	6 mm.	6 mm.
P. rejangensis ..	5 mm.	5 mm.	(anthers say 4 mm.)
P. cuneata ..	5 mm.	7 mm.	3 mm.
P. sessiliflora ..	4-5 mm.	6 mm.	5 mm.
P. sessilis ..	4 mm.	3 mm.	(anthers 2 mm.)

The flowers of *P. Beccariana* are long-pedicelled, the pedicels attaining 2 cm. It seems thus to be the most outstanding species of the genus.

The petals in *Plethiandra* are always 6, and it is probably usual for the ovary to have 6 loculi notwithstanding Sir Joseph Hooker's statement that *P. Motleyi* has 4 and Cogniaux's that his *Medinillopsis* has 3. In some species the calyx-teeth are just evident.

The apical pore of the anthers appears to be constant. The minute spurs at the base of the anther cells are so small that they might be overlooked easily: but there is no evidence that they are general.

The number of the stamens is variable. To the flower of *P. sessiliflora* Stapf ascribes 20; to *P. Beccariana* and *P. sessilis* Cogniaux ascribes 20-25: Hooker ascribes up to 30 to *P. Motleyi*: Stapf states that *P. rejangensis* has 25-30, *P. Hookeri*, 26-30, and

P. cuneata about 30. For *P. Sahebii* 28 is an almost constant number.

Stapf transfers *Plethiandra* to the neighbourhood of *Medinilla,* most of the species of which grow in moss on trees in just such damp forests as it inhabits, the number of stamens being equal to or twice that of the petals, *i.e.* 4, 5, 8 or 10. The Philippine genus *Carionia,* always placed close to *Medinilla,* is obviously also closely allied to *Plethiandra* but the stamens do not exceed 12, or twice the number of the petals, which are in it 6; and the flowers of *Carionia* are much larger than those of *Plethiandra.*

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